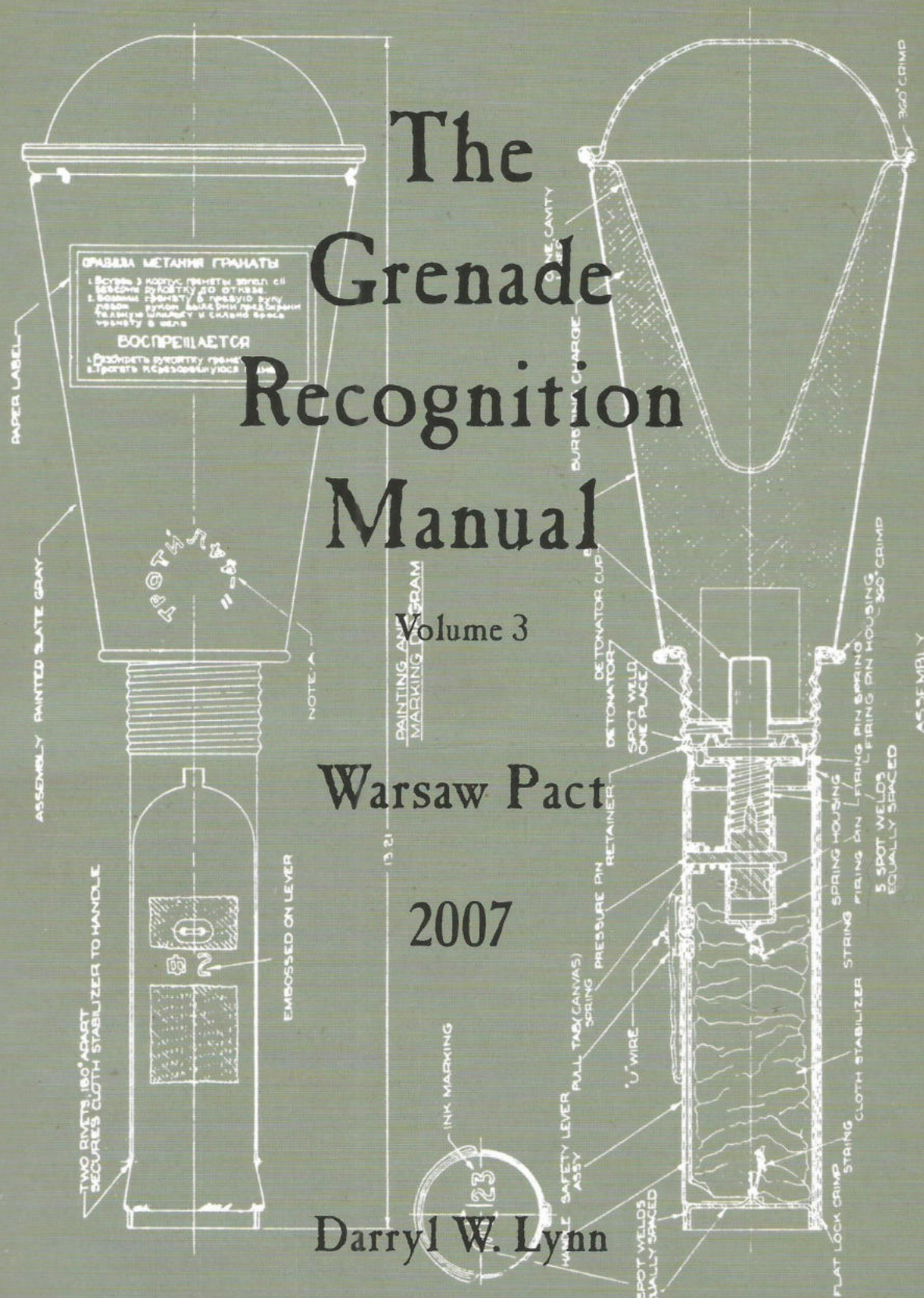
The Grenade Recognition Manual

Volume 3

Warsaw Pact

2007



Darryl W. Lynn

The Grenade Recognition Manual

Volume 3

Warsaw Pact
2007

Darryl W. Lynn

D.W. Lynn
Victoria B.C.
Canada

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Authors Note

Once again, I am attempting to address a shortfall in published material. Grenades are the most ignored weapon in the arsenal of an infantry soldier, not by the soldiers themselves, but by most authors that write books on weapons. A great deal of time and effort is spent on the rifles, pistols and machine guns in use, but the grenade is often relegated to a short little section and only the most common ones will be listed. I hope to address that shortfall in my books. This is the third of the series, the first was on American Grenades, and the second dealt with British and Commonwealth grenades. This book deals with grenades in use by the countries of the Warsaw Pact.

Russian and Warsaw Pact grenades have a somewhat hazy history; while it is possible to clearly identify the country of origin of the earlier grenades the more modern grenades can be a different matter entirely. The Russians, under the name of the USSR, developed grenades that were and are continuing in use by former Warsaw Pact nations, it is also likely that other Warsaw Pact nations developed grenades that were used by other members and possibly by the Russians. In light of these facts, this book will deal with grenades from Russia, Bulgaria, Hungary, Poland, East Germany, Czechoslovakia, Romania, and others. These are the countries or territories that were actual members of the Warsaw Pact, Yugoslavia while allied with the Warsaw Pact, and using weapons that were compatible or downright copies of those used by the other nations, was not a member and did not get detailed in the book.

Some photos and diagrams leave much to be desired, but I am of the opinion that a poor photo or diagram, if accurate, is better than none at all. As you might imagine, some of the information and photos have been difficult to find, to say the least. I have been fortunate to have had the help of people throughout the world. A number of people spent many hours translating documents and emailing them to me, reading and editing my conclusions and correcting my text. To them, my sincere thanks. Many other people contributed copies of documents, photos, files, and tidbits of information, again, my sincere thanks. You will find a list of the many people who helped with this book on the next page, please do not assume that the list is complete, it's not, and to anyone I missed, I apologize.

To all of you that have purchased a copy, my thanks for making my efforts a success. I hope you find the books and information presented useful. Yes, there are most likely mistakes, perhaps I could have written it a bit better, or spent more time on research. I could have, but then you would still be waiting for the book. Updates as they become available will be posted on my website.

D.W. Lynn
Victoria B.C., Canada
November 2007

Credits

Without doubt, I will have missed someone that has contributed in a significant manner to this book, to anyone I have missed, my sincere apologies and belated thanks. To the people and organizations listed below, my sincere thanks for all the trouble you have gone through to provide the information and photos that have made this book what it is. Without your help and patience, this book would not have been possible.

Please note there is no specific order to the list, I simply put the names on the list as they came up.

Bulgarian information and photos, Dimitar Mitev
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Photos and information, Nike-Fiocchi

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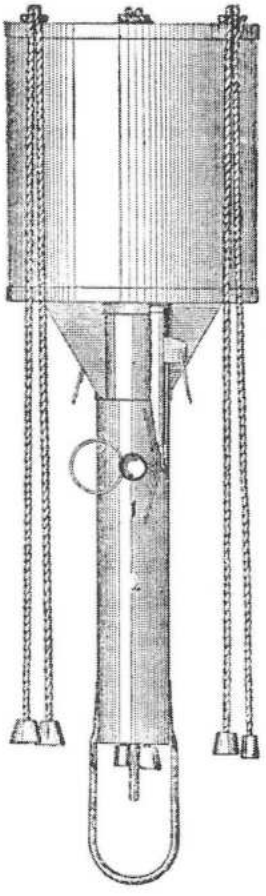

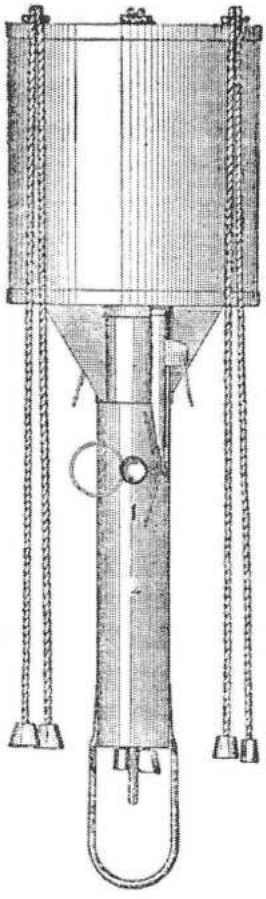

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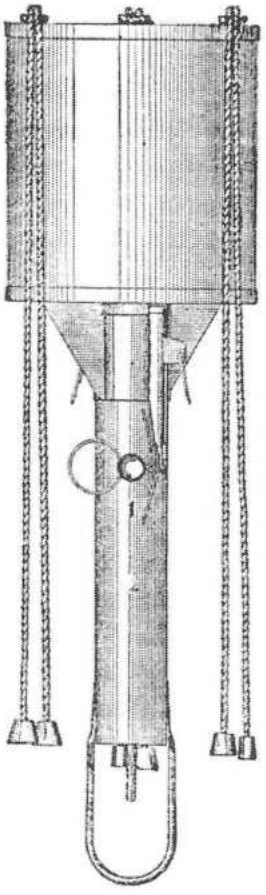

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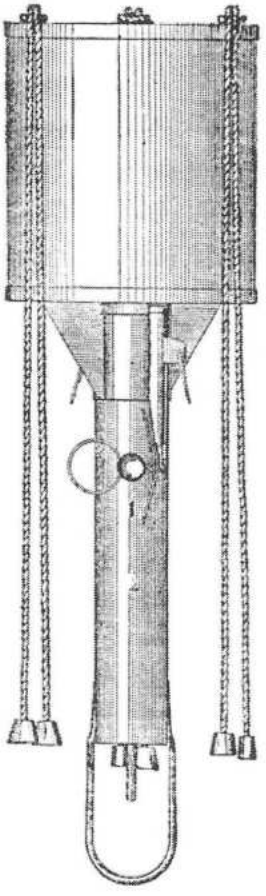

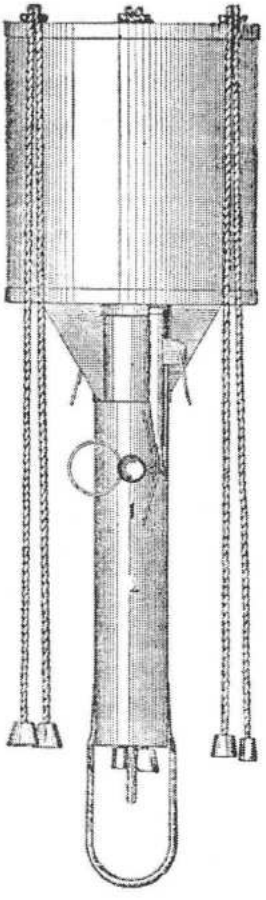

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Russian Grenades

If documents produced during the cold war can be believed, the Russians trace the use of hand grenades back as far as 1382 where the Russians used powder filled grenades during the siege of Moscow by the Tartar Khan, Tokhtamish. I have no confirming references for this. Mention is again made in the 16th Century of special grenade hurling machines used in Novgorod and Pskov. Later mention is made of grenades not only being used in siege warfare but also in the field. These grenades took the form of powder filled metal balls being ignited by a fuze that was lit before throwing. Apparently in 1610 the Russians conceived of an impact grenade using sparks produced from a flint and steel inside the grenade that would strike when the grenade impacted with the ground and ignite the explosive content.

During the Russo-Japanese War (February 1904 - September 1905) the modern grenade was finally seen as a valuable tool of the infantry soldier. Both sides in the conflict used many thousands of grenades. The Russians used a mixture of factory produced and improvised grenades. There were two types of factory-produced grenades available, albeit in small numbers.

The first was a percussion type invented by a Captain Lishin of the Eastern Siberian Mortar Company. This consisted of a zinc container filled with a Pyroxylin demolition block. A red copper thimble was soldered to the cover of the casing. A percussion cap was placed inside the thimble. The grenade body was 120 mm long with a handle 480 mm long. The entire assembly weighed approximately 600 grams. Unfortunately little else is known about this particular grenade.

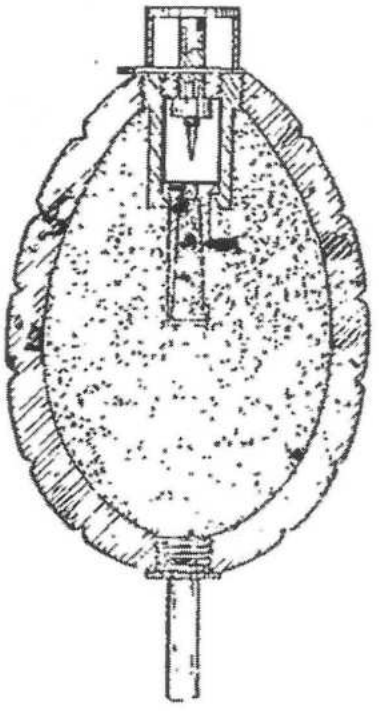
The second of the factory-produced grenades was also a percussion type, invented by Captain Zelenski. This had an ovoid shaped cast iron body grooved both longitudinally and horizontally on the outer surface. The body contains a black powder bursting charge of approximately 150 grams. The igniter mechanism is screwed into the sharper end of the grenade. The igniter casing has a blank cartridge at the lower end and is closed at the top end by a stopper with small hole in the centre. The striker passes through the hole and is held in position by a brass shear wire. A disc is attached to the top end of the striker and the bottom end sharpened into a firing pin. The blunt end of the grenade has another casing screwed into it to form a socket for the wooden handle. The bottom end of the grenade is fitted with goose feathers to further stabilize the grenade in flight. When the grenade is thrown, the handle and goose feathers serve to cause the grenade to fly headfirst. When the grenade strikes the ground, the striker is driven down onto the percussion cap of the blank cartridge causing it to fire. The flash from the cartridge fires the main black powder charge.

During the Siege of Port Arthur (July 1904- January 1905) more than 100,000 of the two grenades were sent to Russian forces. This number proved to be inadequate and the Commander of Russian forces, General Kondratenko authorized the production of grenades within the fortress. At the height of production several thousand were being produced daily.

These improvised grenades took several forms, use being made of old brass or cast iron shell casings. The casings were cut down to a length of four inches and filled with 140 to 600 grams of explosive. They were initially fuzed with a 12-15 second length of Bickford fuze that was lit by matches or a wick. Sometime later an igniter was devised constructed of a cartridge casing filled with black powder and fixed to the end of the bickford fuze and soldered to the outside of the grenade. The end of a goose feather filled with friction compound with a steel friction wire was inserted in the cartridge case. When the wire was pulled out the resulting sparks ignited the black powder and in turn the bickford fuze. It can be reasonably assumed that other forms of improvised grenades were also produced.

In 1904 Russian troops were supplied with a rifle grenade based on the percussion grenade designed by Captain Zelinsky. A long launching rod (.75 metre) consisting of an iron rod with copper obturating bands was fixed to

the base of the grenade body. The grenade, when fitted to the rifle, had the body resting on the muzzle of the rifle. When fired the grenade was projected to a distance of about 140 yards. Captain Zelinsky continued to improve upon his rifle grenade after the end of the Russo-Japanese war. He replaced the cast iron body with one of aluminum reducing the weight of the grenade to 600 grams. He also introduced a new striker mechanism making the grenade safer to handle. The new grenade was dependable and the impact striker mechanism so sensitive that it would explode when it struck the surface of a body of water. The range was increased to 400 metres. The bursting charge was changed to TNT. This grenade was adopted as standard equipment in 1909.



1st Pattern Zelinsky Rifle Grenade

In 1910 a grenade consisting of a thin zinc body and wooden handle was developed. The body contained a bursting charge of 600 grams of Melinite or TNT and five metal grills to provide fragments. The handle held a retracting device with a hook that held the head of the striker. The ignition device consisted of a percussion cap and 5 second length of fuze. This grenade was about 250 mm long and weighed about 1200 grams. The Model 1912 eliminated the internal grills making the grenade an offensive grenade instead of fragmentation.

Model of 1914 with supplemental charge fitted shown beside a bottle to illustrate size.

At the beginning of World War I, the Russians had the Bdultov Hand Grenade (Model 1914) which was an improved model of the Model 1912 but weighing less, about 700 grams, and which could be thrown about 40-45 metres. Also developed during the war were special demolition grenades that were equipped with cords and weights. When thrown the cords would entangle themselves in barbed wire entanglements and blow a hole through the wire. The first of these was the Novikovi and Fedoreov model. A heavy grenade weighing 2.29 Kg and containing 1640 grams of TNT or Ammonal it was provided with a fuze delay of 12 seconds.

When Russian industry could not produce enough grenades for use at the front, the Allies, particularly Britain and France, shipped supplies of grenades to the Russian forces. The British supplied the No. 15 Mk. I grenade. This grenade had failed at Loos and had been withdrawn from British service. They were then shipped to the

Russians; I assume the thought being that a poor grenade was better than no grenade. The British also supplied the No. 16 Mk. I and later supplied the No. 5 Mk. I Mills bomb. The French supplied the P1 and F1 with the Model 1915 Percussion igniter.

The Russians also used a 40.6 mm smooth bore cup discharger for firing both fragmentation and illumination grenades to a range of up to 450 metres. This was the first of the cup dischargers and was known as the Karnaukov type. A later version, known as the Dyakonov type, was rifled and apparently could fire a grenade to a range of 850 metres. The grenade used with this type had projections on the body to fit the rifling in the launcher. It was of a bullet through design being fired by a normal ball cartridge.

The Russians withdrew from the First World War because of the Revolution of 1917. That and the Civil War that followed effectively ended grenade development for a few years until the country could get back on track. In 1930 Russian designers modified the Model 1914 grenade by adding a supplementary fragmentation sleeve and other improvements redesignating it the Model 1914/30. This gave the grenade both a defensive and offensive capability. In 1931 they adopted the F1, a development on the French F1 using a Russian designed Kovesnikov fuze mechanism. The F1 body was altered in 1937 eliminating the filling plug in the bottom and entered into mass production. In 1933 the Russians adopted another Dyakonov designed grenade, the RGD 33, that also had a removable fragmentation sleeve and both defensive and offensive capabilities. The grenade had a double safety device incorporated in the handle that proved to be too complicated in the long run.

Russian Defensive Location during WWII, note the PTRS 1941 anti tank rifle in the background and the VPGS 41 anti tank grenade in the forground.

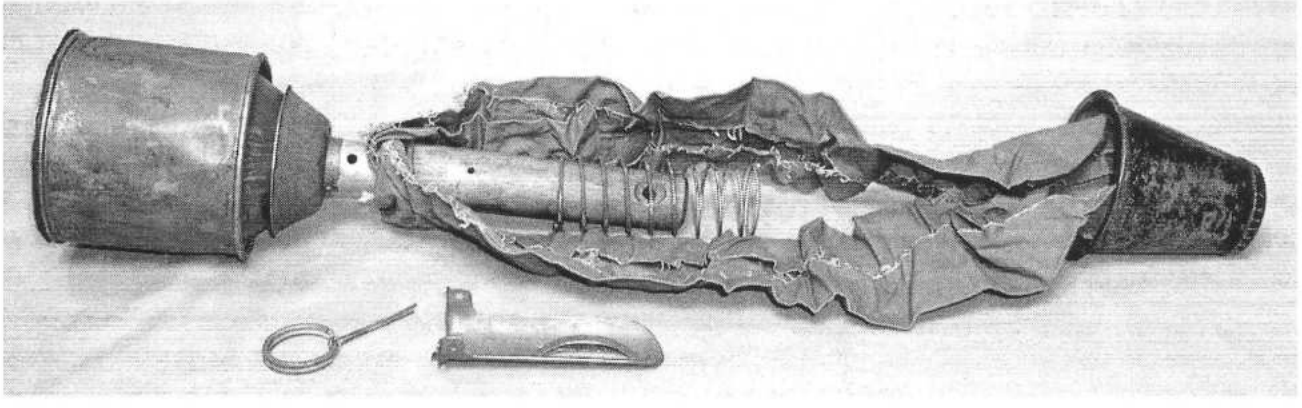
The Russians entered the 1939-40 war with Finland using the M1914/30, F1, RGD-33, and some numbers of British Mills bombs, perhaps leftovers from WWI or some that had been taken from Latvian stocks. During the Russian-Finnish war they also learned that the infantry needed a method to combat tanks and other armoured vehicles as well as bunkers and emplacements. As a result, in 1940 the RPG-40 was adopted. This was little more than a large explosive charge mounted on a handle containing an impact igniter, but it was effective against light armour, up to 20 mm, and particularly against bunkers or other defensive positions. The RPG-40 anti tank grenade was virtually ineffective against the German armour so in an attempt to increase the effectiveness larger explosive containers were fitted to the RPG-40 grenade. This increased the armour penetration slightly to 25 mm. The new grenade was the RPG-41. To muddy the waters a bit, a large explosive container was also fitted to the handle of the RDG-33 for use as an anti tank grenade, designated the RPG-41vk.

They also developed the VKG-40, a grenade employing a shaped charge that was launched from a cup discharger mounted on the Mosin Nagant rifle. It had a range of up to 150 yards and was capable of penetrating armour up to 50 mm. In 1941, the VPGS-41, a rodded antitank grenade employing a shaped charge was developed. Possibly so that any rifleman could then fire an anti tank grenade, not only those equipped with cup dischargers.

At this point, the venerable F1 grenade with the Koveshnikov type fuze was employed as the main fragmentation grenade. In 1941 two engineers, Bednyakov and Viteni created a new universal fuze mechanism that was easier and faster to produce than the Koveshnikov type. The UZRG mechanism and its derivatives became the standard and were eventually used on most Russian and Warsaw Pact grenades.

The German invasion in 1941 destroyed much of Russia's industrial capabilities and also put a strain on the facilities producing grenades; the F1 bodies needed a foundry to produce. A cheaper, easier to produce model was required. To that end, the RG-41 was developed. Employing a sheet metal casing with fragmentation liner, it was much easier to produce with much less equipment. The fuze mechanism in the RG-41 was a complete departure from normal type fuzes and because of that, was not a particular success. The body was modified to accept the new UZRG fuze mechanism and the RG-42 was born. Both the F1 and RG-42 continued to be produced throughout the remainder of the war and for many years after.

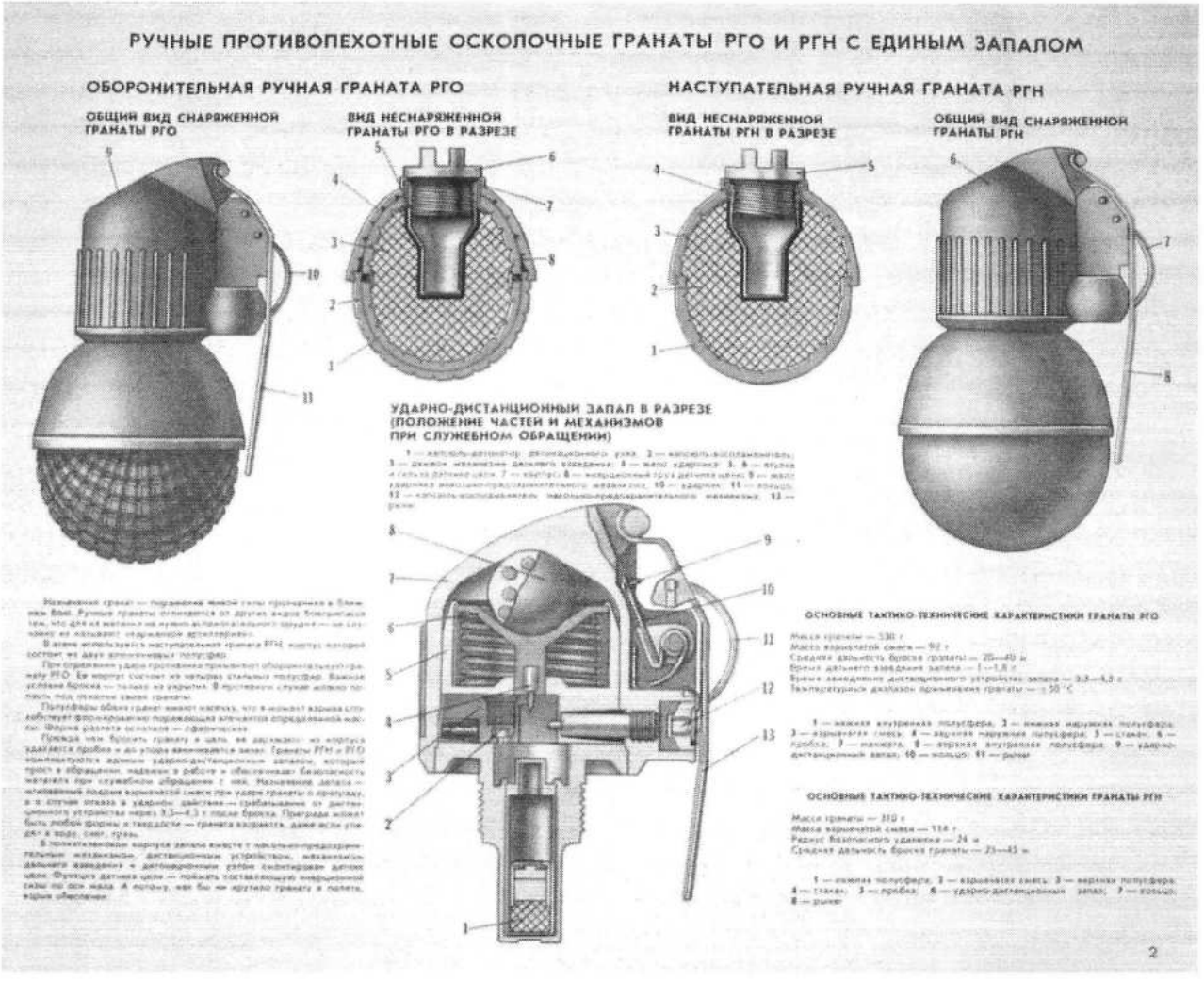
Soviet Engineers eventually developed a new antitank grenade, RPG-43 that was adopted in April 1943, followed closely by the RPG-6 in October of 1943. Both of these grenades employed a shaped charge to defeat the heavier German armour proving much more effective than any other anti tank grenades in Soviet service. These two grenades remained in service for many years, also being supplied to Soviet satellites during and after the war. After the war, Russia continued to use and produce the grenades developed during the war. Remaining stocks of older grenades like the RPG-40 were supplied to other countries under Soviet influence. It was not



RPG-43 shown extended as it would be after throwing.
Photo - Ed Strazdes

until the 1950's that they began to significantly change the grenades in use. The RGD-5 was taken into service replacing the F1 as the first line fragmentation grenade. Later, the antitank grenades were replaced by the RKG in Russian/Soviet service. In the 1980's the RGD-5 began to be replaced by the RGO and RGN grenades.

Russian grenades became the standard in the Warsaw Pact being adopted by all the countries of the pact and being produced in most. Various countries may also have developed their own grenades, using them in conjunction with the Russian models. In addition millions of Soviet/Russian grenades of all types were exported all over the world. Even the earlier version Russian/Warsaw Pact made grenades continue to be encountered all over the world.

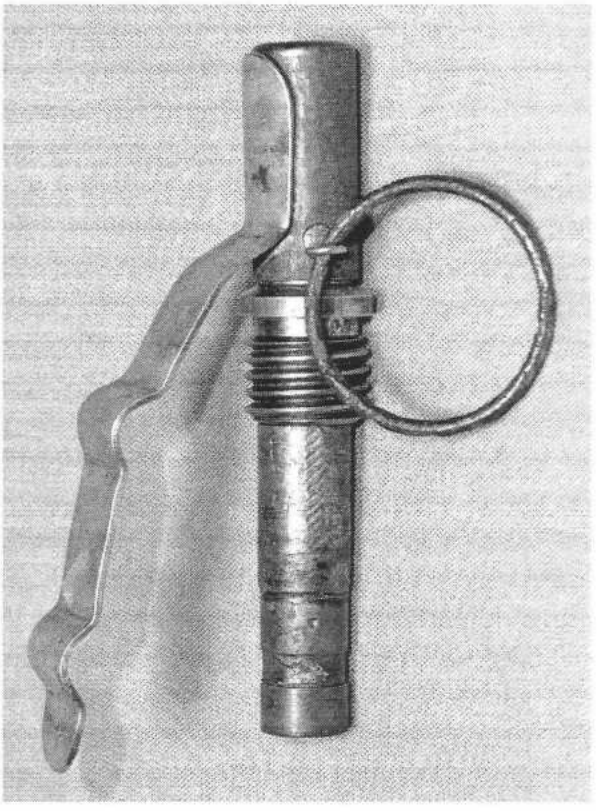


Russian Training Poster showing RGO and RGN grenades

Russian Fuze Mechanisms

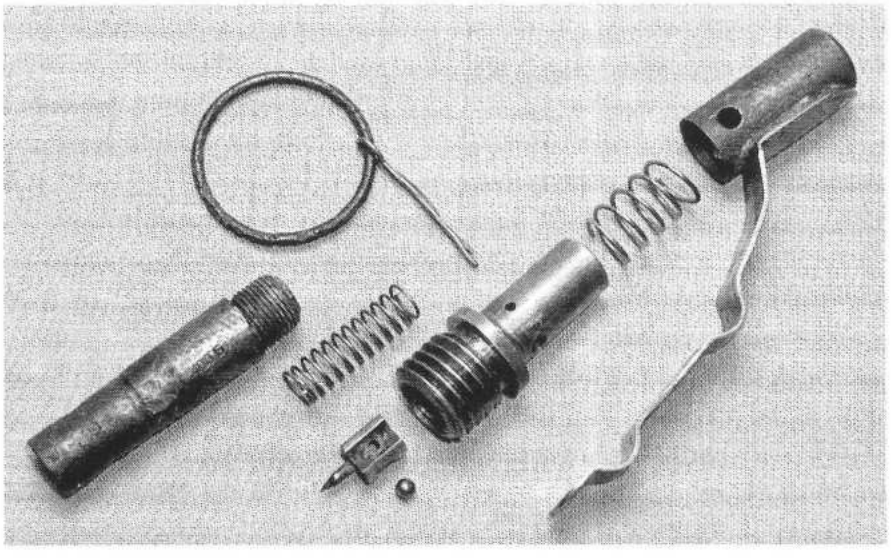
Koveshnikov Fuze Mechanism

This was the original type of fuze mechanism used in the Russian F1 grenade. Designed in 1931 it was used into the Second World War until replaced by the UZRG. The Koveshikov mechanism was also used on the improvied mortar shell grenade. Some stocks of these fuzes may have remained after WWII but it is unlikely they were used much after the war.



Koveshnikov Fuze Mechanism
Photo - Ed Strazdes

There are two main components of the fuze, the striker mechanism and the igniter mechanism. The striker mechanism consists of a brass body with the base externally threaded to fit the grenade body. A shoulder at the top of the threading prevents the fuze screwing too far into the grenade. The base of the body is internally threaded to accept the detonator assembly. The body is centrally bored from the bottom to fit the striker. It is bored leaving a solid portion at the top. A smaller gas escape hole is drilled through the top of the body. The top section, above the shoulder is smooth and has two holes drilled through the side just above the shoulder. The larger of the two is drilled into the central bore and is meant for the retaining ball. The smaller hole, drilled completely through at 90 degrees from the larger hole is for the safety pin. The safety cap with attached lever, is made of steel and fits over the top of the body. A hole, drilled through the cap at 90 degrees from the lever, is for the safety pin to fit through. The lever is normally found with two "bumps" bent into it to aid in gripping the lever. The striker is steel with a striker point at the bottom end. A dimple in the side is made to fit the retaining ball, and a hole to match the safety pin holes is drilled through. Two gas excape slots are formed opposite each other at the same point as the safety pin holes. The safety pin fits through the safety cap, main housing, and striker ensuring that the mechanism will not move until it is completely removed.



Koveshnikov Fuze Mechanism Disassembled
Photo - Ed Strazdes

The striker mechanism is fitted together by inserting the striker spring and striker into the bottom of the body and compressing the spring until the retaining ball hole and dimple line up. The retaining ball is inserted and the cap with its own spring is pushed down until it

holds the ball in place. The safety pin is then inserted to hold the entire mechanism in the cocked position with both the striker spring and cap spring compressed. The detonator assembly consists of a brass tube threaded at the top end to fit into the bottom of the striker mechanism. A percussion cap fits into the top end covering a delay element of compressed powder. The bottom end is fitted with a detonator.

When the safety pin is pulled, the mechanism is held safe by the cap and lever assembly. When the grenade is thrown, the cap, under pressure of the cap spring is thrown off axially. When the cap clears the retaining ball, the striker under pressure of the striker spring forces the retaining ball out of the mechanism and continues down until it strikes the percussion cap. The percussion cap fires, igniting the delay element. The delay element burns for 3-4 seconds before reaching the detonator and causing it to explode.

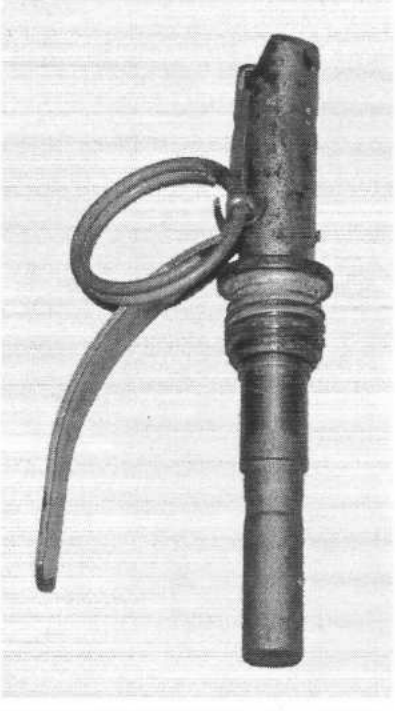
UZRG Fuze mechanism

This fuze mechanism was designed by two Soviet engineers, Bednyakov and Viteni, during WWII to replace the Koveshnikov fuze mechanism. It relies heavily on stampings and is much easier to manufacture than the more robust Koveshnikov mechanism. In Russian the name is " Unifitsirovannyy Zapal K Ruchnym Granatam" basically meaning "Standardized Hand Grenade Fuze".

There are two basic components, the striker assembly and the detonator assembly. The body of the striker assembly is made of sheet metal stamped into a cylindrical shape with a partially closed top. A cutout in the side of the top allows the safety lever to engage the striker. The bottom of the body is internally threaded. A threaded adapter is attached to the bottom of the body. Early versions of the fuze have the adapter permenantly attached to the body, later versions do not. The striker has a very sharp point on the bottom end and a necked down portion to engage the safety lever at the top end. A guide washer is loosely attached to the striker by crimps on the striker above and below the washer. The safety lever is stamped out of sheet metal and has a notch in the top to engage the head of the striker. Two wings on the lever are bent around allowing the safety pin to fit through both the lever and body of the mechanism.

The detonator assembly consists of a brass casing that is threaded at the top end to fit the threading in the striker assembly. A percussion cap is fitted into the upper threaded end. A delay element runs down the centre of the casing. A copper detonator capsule is crimped onto the bottom end. When the detonator assembly is screwed into the bottom of the striker assembly it holds the entire mechanism together.

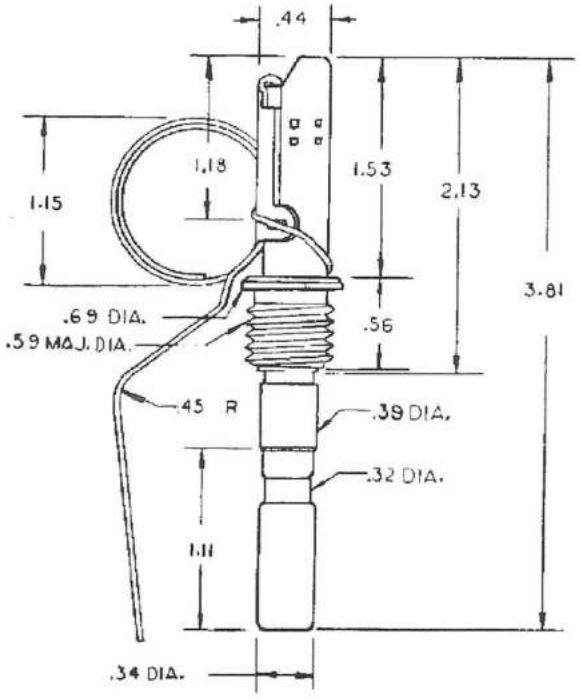
When the safety pin is pulled and the grenade thrown, the striker, under pressure of the striker spring is forced down throwing the safety lever off in the process. During its travel, the striker is guided by the guide washer which ensures that the striker point hits the percussion cap. The percussion cap fires and ignites the delay element. The delay element burns for a period of 3.2 - 4 seconds before reaching and initiating the detonator.



UZRGM fuze mechanism

UZRGM Fuze mechanism

This fuze mechanism was an improvement on the UZRG. The designation UZRGM(Unifitirovannyy Zapal k Ruchnym Granatam Modernizirovannyy) translates to "Standardized Hand Grenade Fuze Modernized". The main difference between the two fuzes is in the detonator assembly. The casing is aluminum and has an aluminum detonator. This eliminates the compatibility problems associated with the reaction between the copper and brass fuze



Internal and size diagram of the UZRGM Fuze mechanism

components and black powder delay train. It also reduces the weight of the mechanism by 12 grams. This has been the standard grenade fuze for the Warsaw Pact forces since inception and is likely still in production.

There are two basic components, the striker assembly and the detonator assembly. The body of the striker assembly is made of sheet metal stamped into a cylindrical shape with a partially closed top. A cutout in the side of the top allows the safety lever to engage the striker. The bottom of the body is internally threaded. A threaded adapter is attached to the bottom of the body to allow the fuze to screw into the various grenades. The striker has a very sharp point on the bottom end and a necked down portion to engage the safety lever at the top end. A guide washer is loosely attached to the striker by crimps on the striker above and below the washer. The safety lever is stamped out of sheet metal and has a notch in the top to engage the striker. Two wings on the lever are where the safety pin fits through both the lever and body of the mechanism. There are two types of safety lever, one has the lever bent in a shape that conforms with the body of the RDG-5, the other has a more angular shape when issued for use with the F1 or RG42.

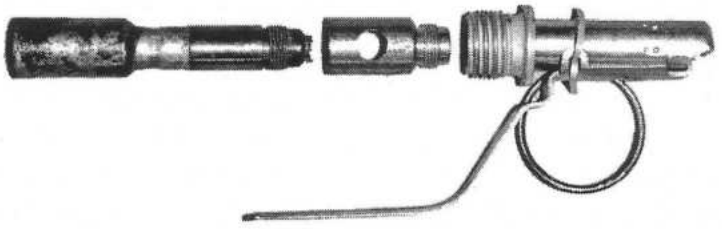
The detonator assembly consists of an alumimum casing that is threaded at the top end to fit the threading in the striker assembly. A percussion cap is fitted into the upper threaded end. A delay element runs down the centre of the casing. A detonator capsule is crimped onto the bottom end. When the detonator assembly is screwed into the bottom of the striker assembly it holds the entire mechanism together.

The mechanism is marked on the safety lever with the designation in Cyrilic lettering. A lot number and the date of manufacture are included in the markings.

When the safety pin is pulled and the grenade thrown, the striker, under pressure of the striker spring is forced down throwing the safety lever off in the process. The guide washer guides the striker during its travel. The striker point hits the percussion cap that fires and ignites the delay element. The delay element burns down for a delay of 3.2 – 4.2 seconds before reaching and initiating the detonator.

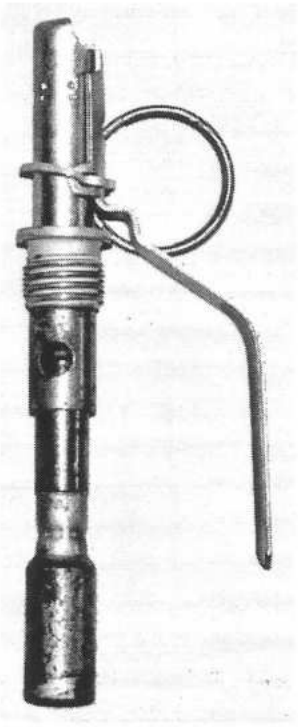
UZRGM Practice Fuze

The practice fuze is made in the same basic manner as a UZRGM fuze mechanism. The striker mechanism is the same but has a longer striker. Where the detonator would normally screw into the bottom the practice fuze has an adapter bushing. The adapter bushing is externally threaded at one end to screw into the striker mechanism. The other end is internally threaded to accept the practice charge. Two holes are drilled through the adapter to allow gas escape. The practice charge has a percussion cap mounted in the top end, which is threaded to screw



UZRGM Training Fuze
Disassembled to show Mechanism, Adapter bushing, and Charge

into the adapter bushing. A time delay fuze runs through the body down to a smoke charge at the bottom end. The body, striker mechanism, and adapter bushing are all reusable. The striker itself is normally replaced. To reload the fuze, unscrew the expended practice charge. The adapter bushing is then removed taking care to retain the spring and washer. Using a special drift, which is supplied on a ratio of one to every four grenades, insert the new striker in the end of the drift. Put the washer and spring onto the striker and insert the entire assembly into the housing. Push up until the head of the striker passes through the guide washer. Replace the safety lever and pin. Screw the adapter bushing back into the bottom and put a new practice charge in place.



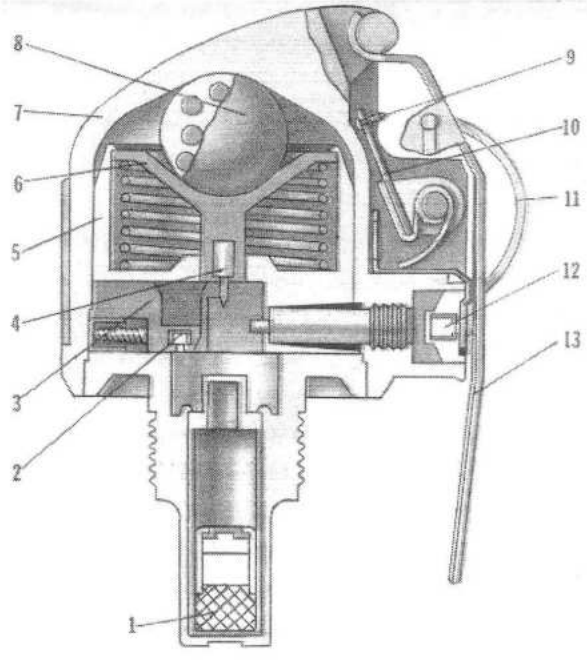
UZRGM Training Fuze

UDZ/UDZS

The UDZS is a modified version of the UDZ, the exact differences are currently unknown.

This igniter mechanism has a dual ignition system. Once the safety lever is released, there is a 1 to 1.8 second arming delay after which the fuze will operate on impact. If after a delay of 3.5 to 4 seconds the grenade has not impacted or the impact was insufficient to cause the fuze to operate, the self destruct will operate and cause detonation.

The mechanism is housed in a plastic body. A central well in the body contains the impact mechanism consisting of a striker, striker spring and weighted ball. Inclined surfaces on the inside of the housing and on the striker are designed so that if the ball moves in any direction it will force the striker down onto a primer. The safety lever is attached to the side of the mechanism. The safety lever holds the striker in the cocked position. A housing on the side, underneath the safety lever contains the primer. There are three delay elements located within the housing with the ignition ends facing a small chamber under the primer. One delay element is the self destruct delay, one is the arming delay and one is a shutter release. The shutter is located in the mechanism below the impact mechanism. The bottom of the mechanism is closed by a plastic plug that contains the detonator and is threaded to match threading in the detonator well of the grenades



When the pin is pulled and the grenade thrown, the safety lever rotates up propelled by the striker and striker spring. As it is pushed out of the way it exposes the primer. The

striker rotates downward and strikes the primer. The primer ignites and flashes into the small chamber. The flash of the primer ignites the three delay elements. When the combustible material in the shutter release burns away, it allows the shutter to rotate under spring pressure. When the combustible material in the arming delay burns away, it allows detents to withdraw under pressure of springs freeing the impact mechanism. When the grenade impacts the weighted ball moves against the inclined surface forcing the striker down onto a primer which fires and flashes into the detonator causing it to detonate and initiate the main filling. Should the impact mechanism not operate in 3.5 to 4 seconds, the self destruct delay burns down and initiates a small relay detonator which fires, causing the main detonator to fire and initiate the main filling.

Stick Grenade

This is a pre First World War grenade that remained in service during the early portion of WWI. In looks it is similar to a Japanese grenade of the time and the later British No. 1. It is entirely possible that the Japanese grenade influenced its design as it did with the British grenade.

Stick Grenade

TYPE- Fragmentation
WEIGHT- 800 gm
IGNITER- Impact
FILLING- 200 gm

The body is of sheet metal with a cast iron fragmentation ring around the middle. A long wooden handle is fitted into a socket in the bottom and has a tail attached at the bottom end. The body is filled with explosive and has a detonator well formed in the top end. There are two indexing pins opposite each other near the top end of the body. A cap fits over the top of the body and has two slots cut into it corresponding to the indexing pins. The slots are formed so that there are notches for two positions, safe and armed. The cap must be turned into the armed position prior to throwing. The striker is mounted in the centre of the cap and has a partially compressed spring preventing the striker from hitting the detonator set until the grenade impacts after throwing. The spring also puts tension on the cap while in storage or carriage so that the cap cannot slip out of the safe notch and rotate accidentally into the armed position. A safety cap fits over the entire top. The safety cap is a sheet metal cylinder with a top and two spring clips which engage the fragmentation ring keeping it off and protecting the firing cap. The detonator set consists of a detonator with percussion cap mounted in the open end.

For use the grenade must be primed by first removing the safety and firing caps. A detonator set is inserted into the detonator well and the caps replaced ensuring the firing cap is in the safe position. When ready to throw, remove the safety cap, rotate the firing cap into the armed position and throw the grenade. The handle and tail ensure the grenade lands headfirst which, on impact, will drive the firing cap down, overcoming the spring and allowing the striker to hit the primer in the detonator set and fire the grenade.

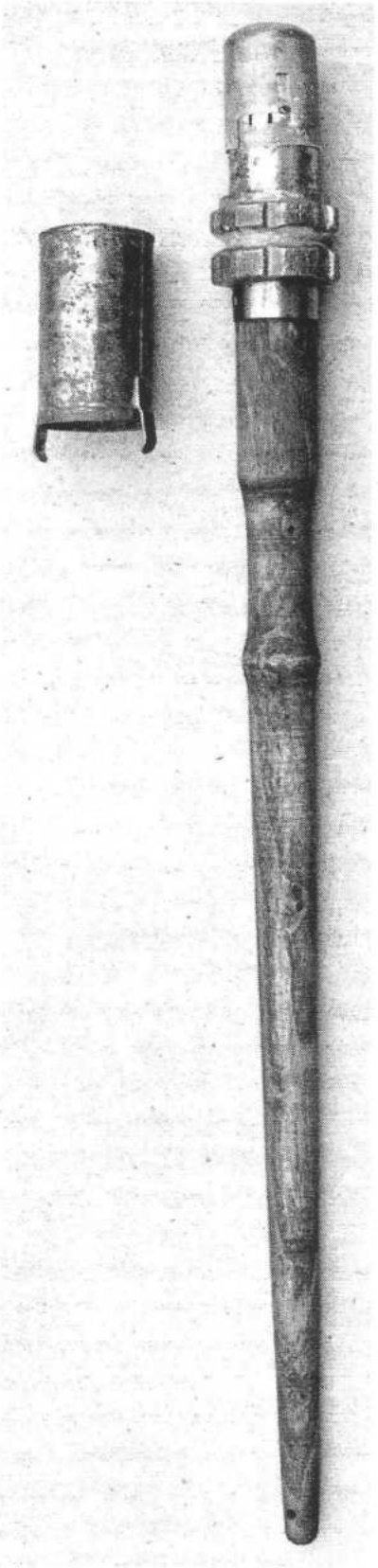
Zelinsky Rifle Grenade

This is an improved model of Captain Zelinsky's rifle grenade that he designed in 1904. This grenade was adopted in 1909 and was used throughout Russian involvement in WWI.

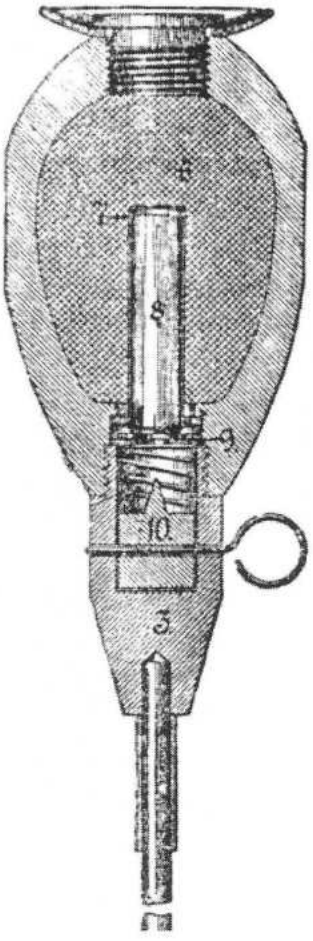
The body is egg shaped and has a thick casing made of aluminum. The thickness of the body provides the fragmentation effects. There is a large threaded hole in top closed by the filling plug. There is a sheet metal cup held on by the filling plug. The base of the body also has a threaded hole that is bored almost through into the cavity. There is a smaller hole in the bottom that penetrates into the cavity. There is a thin

Zelinsky Rifle Grenade

TYPE- Fragmentation
WEIGHT- 900 gm
FILLING- 50 gm
IGNITER- Impact
RANGE- 150-300 metres



Stick Grenade
Photo - Lothar Tabbert



Zelinsky Rifle Grenade

detonator housing fitted through the smaller hole into the centre of the cavity sealing the grenade. The detonator assembly consisting of a detonator and percussion cap fits into the housing. The impact igniter mechanism screws into the bottom hole. The igniter consists of the housing that has a hole bored partially through from the top. A heavy striker is fitted into the hole and a creep spring placed on top of that. The safety pin fits through the housing and a corresponding hole in the striker. The launching rod is attached to the bottom of the igniter mechanism housing and has a gas check at the bottom. There are copper obturating bands along the length of the rod.

When the grenade is to be fired, the launching rod is inserted into the rifle barrel and the rifle loaded with a launching cartridge. Just before firing the safety pin is removed which releases the striker. The creep spring is strong enough to hold the striker back at this point. When the rifle is fired the gases formed by the launching cartridge push against the gas check expanding it into the barrel. The gases trapped behind the gas check push the grenade off the rifle. When the grenade impacts, the cup on the front prevents it digging in before exploding increasing the effectiveness. The striker overcomes the creep spring and hits the percussion cap that then causes the detonator to explode. The detonator causes the main filling to explode. The igniter mechanism apparently was so sensitive after firing that the grenade would explode if it hit a body of water.

Ruchnaya Granata 1910

Ruchnaya Granata 1910

TYPE- Fragmentation
WEIGHT- approx 1200 gm
LENGTH- 250 mm
WIDTH- 70 mm
FILLING- 600 gm Melinite
IGNITER- Percussion
DELAY- 5 sec.

There is evidence that the Russians developed a fragmentation grenade in 1910 which I believe is virtually identical to the later Ruchnaya Granata 1912. The 1912 model is the offensive version. In fact the grenades are so similar they are often confused for each other, normally being identified as the M1912. The M1910 had five metal grills lining the body provide fragmentation.

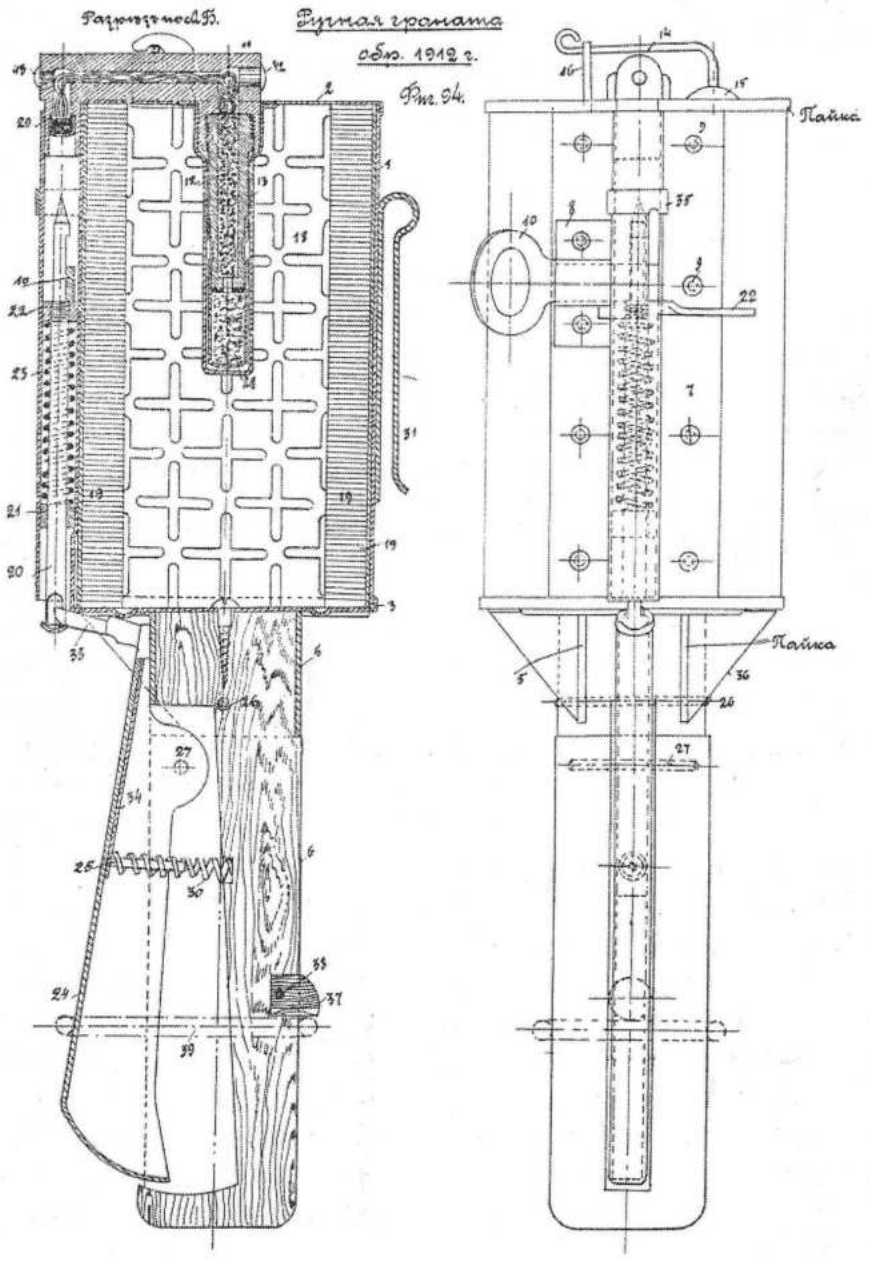
Ruchnaya Granata 1912

This grenade was adopted for use in 1912 as an offensive version of the Model of 1910. It was only in use for a few years before being replaced by the M1914.

The body is a sheet steel casing containing a large explosive charge. The body is square with the top and bottom soldered on. A sheet metal socket is attached to the bottom of the body and is reinforced by four brackets. A belt hook is riveted to one side. A catch is attached to the top near the edge with the igniter mechanism. A clip to hold the detonator and fuze assembly is also attached to the top of the body and engages the catch. A hole in the top of the body has a detonator thimble soldered in. The striker assembly is riveted to the side of the body opposite the belt hook. The striker mechanism consists of a barrel, long striker with a nail head at the bottom, and striker point at the top end. A spring surrounds the striker. A trigger handle is attached to the striker through a slot in the barrel. A safety slide is attached to the striker mechanism so that the slide will block the movement of the striker when pushed into the safe position. A wooden handle is fitted into the socket on the bottom and held in place by a screw through

Ruchnaya Granata 1912

TYPE- Offensive
WEIGHT- 1230 gm
LENGTH- 250 mm
WIDTH- 70 mm
FILLING- 613 gm
IGNITER- Percussion
DELAY- 5 sec.



Ruchnaya Granata 1910/1912

the bottom of the body and two small nails through the sides of the socket. A sheet metal lever is fitted into a slot in the wooden handle and is held in place by an axis pin. A spring is located under the lever to provide tension. A notch on the top of the lever engages the nail head of the striker mechanism when it is cocked. A safety ring fits over the handle and rests against a small stop block on the back. The safety ring holds the lever against the tension of its spring ensuring that the notch remains engaged with the striker.

The detonator and fuze assembly consists of a square "U" shaped body with a small primer at one end of the "U". The other end is fitted with the detonator. A time fuze runs through the hollow body from the primer to the detonator.

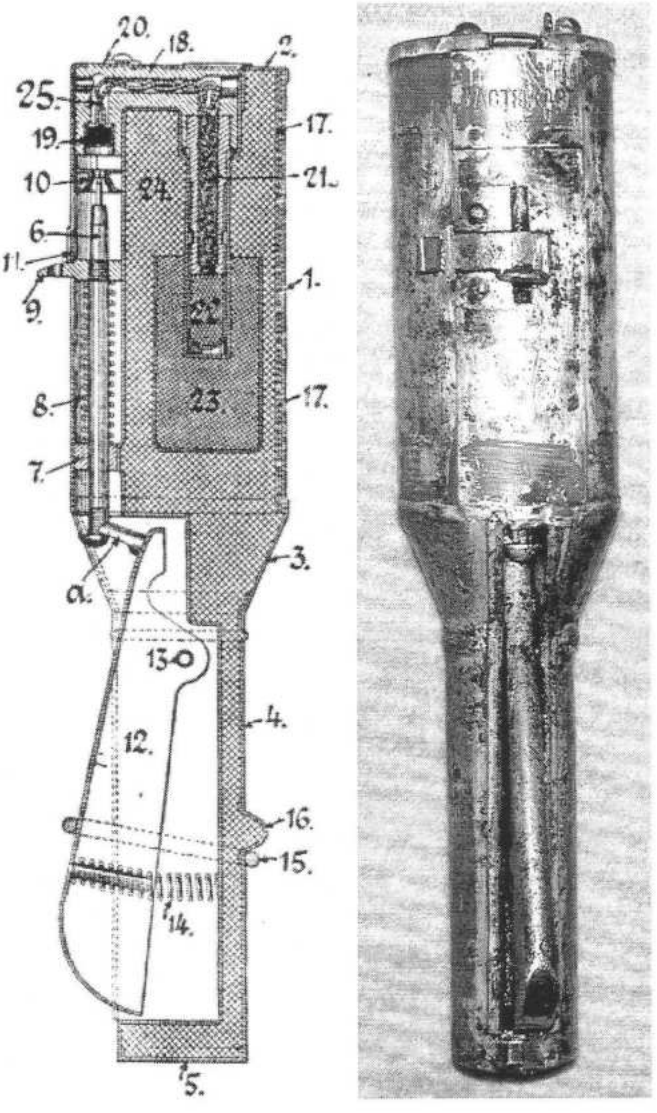
For use the grenade must first be primed. The clip on top of the grenade must be disengaged from the catch and the detonator and fuze assembly inserted with the detonator in the detonator thimble and the primer end fitting into the top of the striker mechanism. The clip is then rotated over the fuze and clipped into the catch retaining the fuze in position. When ready to throw, squeeze the sheet metal lever into the wooden handle against the pressure of the spring and remove the safety ring. Pull out the safety slide and throw the grenade. Once the grenade leaves the hand, the lever is free to rotate outwards propelled by the spring. As the lever rotates, the notch is pulled away from the nail head of the striker freeing the striker. The striker under pressure from the striker spring is driven upward to hit the primer in the fuze. The primer fires igniting the delay fuze, the fuze burns down until it reaches the detonator and sets it off. The detonator in turn causes the main explosive charge to explode.

Ruchnaya Granata 1914

The Model of 1914 grenade is an improvement upon the Model of 1912. Adopted in 1914 it was used throughout

the Russian involvement in WWI up to about 1930 when further improvements were made and it was redesignated Model of 1914/30. It continued in use as the 1914/30 up to about 1941.

The entire grenade, body and handle are made of tin plate. The upper section of the body is lined with a thin perforated fragmentation liner. The top overlaps the main body and is soldered in place. There are two holes in the top joined by a formed depression. The hole for the detonator is slightly off centre and the hole for the percussion end of the detonator set is on the side. A sheet metal latch bolted to the top cap holds the detonator set in place. The handle is made with a tapered section to match the diameter of the body. One side of the handle has a groove formed in it to accept a sheet metal lever that is held in place by an axis pin. A pin is welded into the hollow back of the lever to retain a spring. The spring fits over the pin and against the handle. The lever has a catch at the top end to engage the striker. The igniter mechanism is contained the side of the body corresponding with the hole in the top cap. The igniter mechanism consists of a striker, striker spring, trigger lever and striker clutch. The striker has a nail head formed on the bottom end and striker point on the other. It is fitted into a tube with the spring against the clutch at the bottom and the trigger lever at the top. There is a safety latch attached to the outside of the body in a position so that when engaged it will block the travel of the trigger lever and striker.



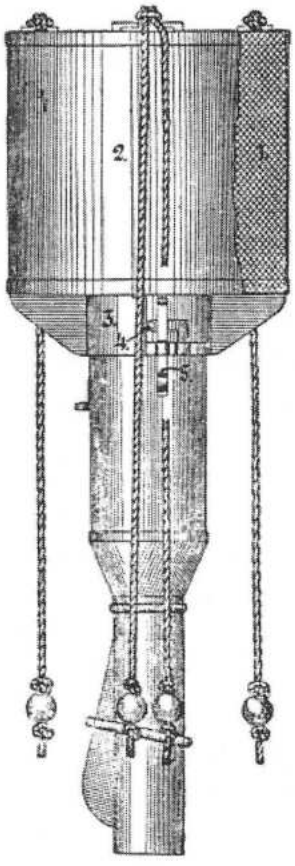
Ruchnaya Granata 1914
Photo - John Roks

The lever in the handle engages the nail head of the striker and keeps it in a semi-cocked position. A ring around the handle rests against a "bump" on the back of the handle holding the lever against the tension of its spring. The detonator assembly consists of a "U" shaped body with a detonator fitted to one end and a primer in the other. The delay fuze runs through the hollow body from the primer to the detonator. If the grenade is filled with TNT or Melinite a booster is used, if filled with Ammonal no booster is required.

Ruchnaya Granata 1914

TYPE- Offensive
WEIGHT- 520 gm
DIAMETER- 45 mm
LENGTH- 200 mm
FILLING- 400 gm Ammonal, Melinite, or TNT
IGNITER- Delay
FUZE DELAY- 3.5-5 sec.
EFFECTIVE RADIUS- 20-25 metres

When required for use, the grenade is primed by rotating the catch on top and inserting a detonator assembly. The catch is then rotated over the detonator assembly until it catches in a small projection on the opposite side. For use, the safety latch is slid out of the way of the trigger lever. The lever in the handle is squeezed into the handle and the ring allowed to drop away. The grenade is then armed. As the grenade is thrown, the lever under pressure of its spring, flies outward rotating on its axis pin. This action withdraws the catch from the nail head of the striker allowing the striker to move forward under pressure of the striker spring. The striker point hits the percussion cap and fires



Supplemental Charge

it. The percussion cap ignites the delay element which then burns down to the detonator. When the flame hits the detonator it fires and causes the main explosive charge to detonate.

Supplemental Charge Model of 1916

The supplemental charge produced to fit onto the Model of 1914 grenade is designed to provide a large enough explosion to blow pathways through barbed wire obstacles and for use against other obstacles such as bunkers. The body is made of sheet tin. There are four cords with weights on the end attached to brackets on the top of the body. The cords are designed to entangle themselves on barbed wire and hold the grenade in a better position to clear the wire when it explodes. The bottom has a socket with four supporting brackets designed to fit the top of the grenade. There are pins on the grenade that fit into slots in the socket of the supplemental charge. By pulling down on the locking pin the body is rotated so that the pins on the grenade lock into slots in the socket of the supplemental charge. Releasing the locking pin prevents the body from rotating and coming loose from the grenade. The supplemental charge is ignited by blast propagation from the grenade.

Chemical Grenade Model of 1914

A chemical (gas) grenade, based on the body of the Hand Grenade Model of 1914 was fielded early in the war. Gas grenades were used in the offense to clear enemy bunkers and in the defense to break up and confuse an enemy attack. In a withdrawal they were used to cover the withdrawal of friendly forces.

The body is virtually identical to the HE version with the exception of a special marking on the body. The marking was a triangular plate with a skull and crossbones and the word chemical on it. The body was filled with a gas compound weighing 550 grams. The most likely filling was Chloropicrin. The filled grenade weighed about 800 grams.

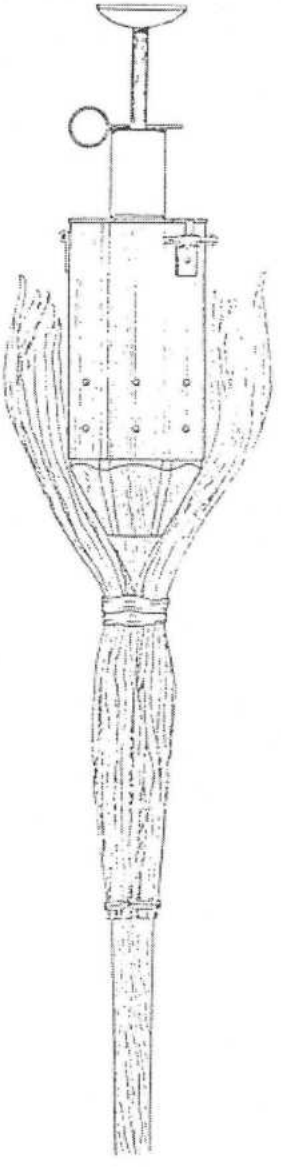
Zaslavski Grenade

This is believed to be an early Russian grenade that was introduced in November 1914.

The body is sheet metal, made in an octagonal shape. The top of the body has a lid that can be opened to fit the detonator. There is a small hinge on one side and a catch on the other that is locked in the closed position by a split pin. The main body is lined with a thin fragmentation liner for the top half of its length and the body closed in the centre by a plate. The explosive charge is fitted into the body and covered by a sheet metal cover with a hole

Zaslavski Grenade

TYPE- Offensive
DIAMETER- 62 mm
LENGTH-Total 560 mm
Body w/o igniter 110 mm
IGNITER- Impact



Zaslavski Grenade

in the centre for the detonator assembly. The detonator assembly consists of a detonator with a primer attached in the open end. A bracket attached to the lid forms the support for the igniter mechanism. A cone shaped spring is fitted inside the bracket. A striker fits through a hole in the bracket with a lip resting on the top of the spring. The safety pin fits through the striker above the bracket preventing the striker from moving down and a pin mounted through the striker below the bracket prevents the striker from falling out. There is a cup shaped plate attached to the top end of the striker. The wooden handle fits into the body for the lower half of the bodies length. The top end of the handle is formed to fit the shape of the body and the lower portion turned down to make the throwing handle. A tail of fibre is wired onto the handle about one third the way up from the bottom. In storage the tail is bound up over the handle with a binding just below the head.

Prior to use, the grenade must be primed. The split pin is removed from the catch and the lid opened. The detonator assembly is fitted into the grenade and the lid closed and locked. For use, the binding is removed to release the tail and the safety pin pulled out to release the striker. At this point, the spring prevents the striker from moving down onto the primer. When the grenade is thrown, the tail ensures it flies headfirst. When the grenade impacts head first, the plate attached to the striker ensures that the striker does not dig in but forces it down onto the primer. The primer flashes into the detonator and the detonator in turn fires the main charge.

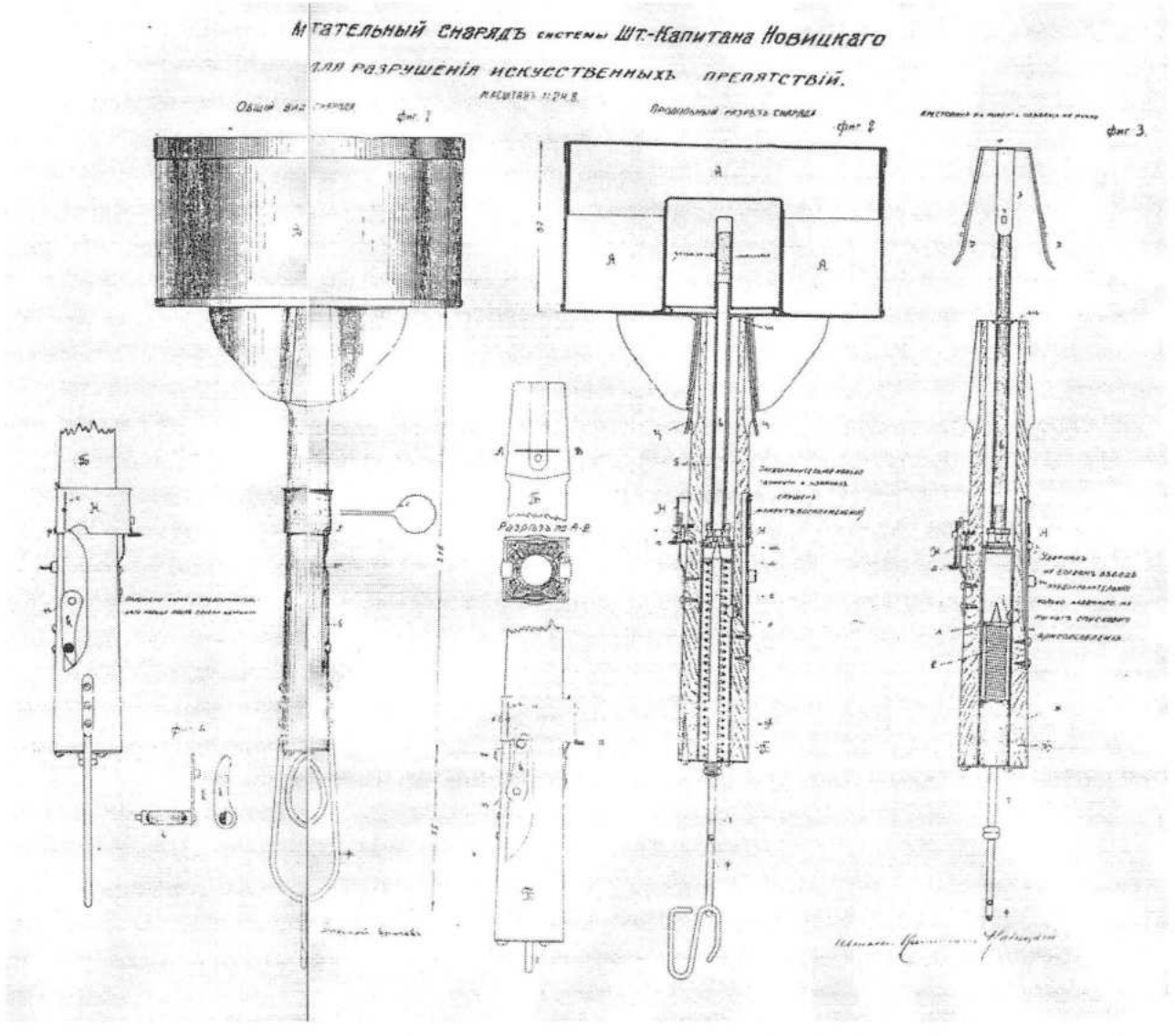
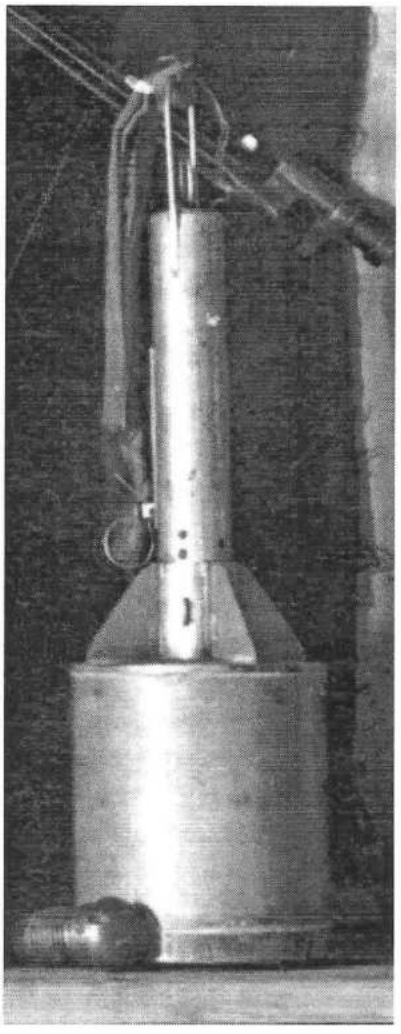


Diagram of an early version or the early development diagrams for the Novikov and Feodorov Grenade

Novikov and Feodorov Grenade



Novikov and Feodorov Grenade

This grenade was developed during the First World War to destroy artificial obstacles such as barbed wire, bunkers or earthworks. The grenade has an extremely long delay and is not designed for use against personnel. It was designed for use by advance troops to blow pathways through barbed wire entanglements for the main assault troops.

The explosive container is sheet metal and has three attachment points fixed on the top. Weighted cords are attached to the three points allowing the cords to hang free. The cords are designed to catch on barbed wire and hold the grenade in place above the ground until it explodes. The bottom of the body has a socket attached supported by four brackets. The detonator well is located in the bottom of the body, centred in the socket. The handle is sheet steel and contains the igniter mechanism. The mechanism consists of a spring-loaded striker in the lower half of the handle. The striker has a ring formed on the end that protrudes out the bottom of the handle and a head with striker point on the other. The striker spring is fitted over the striker before the head is mounted. A trigger mechanism is mounted on the side of the handle about half way up. This consists of a trigger lever, trigger button, and trigger spring. The safety pin fits through the trigger preventing it from being depressed. A carrying ring is attached to the bottom of the handle. The handle is attached to the body of the grenade by pins engaging in the socket. The detonator assembly consists of a percussion cap, delay element, and detonator.

The grenade was most likely issued unprimed with the detonator assemblies separated from the grenade. For use the grenade had to be prepared. The grenade is prepared by removing the handle and cocking the mechanism by pulling back on the striker. This compresses the striker spring between the bottom of the handle and striker head. The striker will engage the trigger bar holding it in the cocked position. The safety pin would then be put through a hole in the trigger preventing the button from being depressed. The detonator assembly was put into position in the head and the handle replaced, ensuring the locking pins engaged properly. At this point the grenade is ready for use.

Novikov and Feodorov Grenade

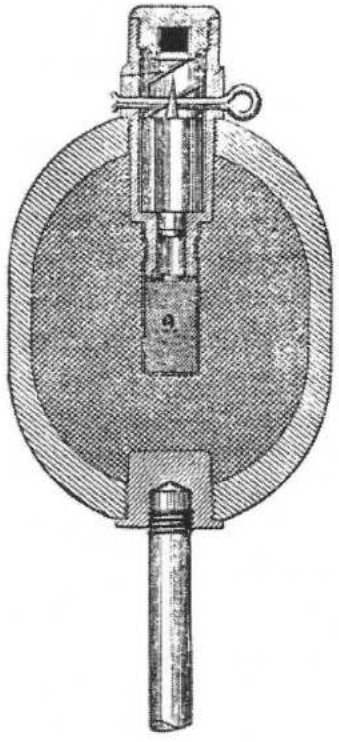
TYPE- Demolition
WEIGHT- 2290 gm
DIAMETER- 119 mm
FILLING- 1640 gm Dynamite
IGNITER- Percussion
FUZE DELAY- 10-12 sec.

For use, gather the cords so they run along the handle and grasp them with the handle. Remove the safety pin ensuring that the button is not depressed. When ready to throw, depress the button, which releases the striker, and throw the grenade at the target. When the striker is released its spring reasserts itself driving the striker up until it hits the percussion cap in the detonator assembly. The percussion cap fires igniting the delay element. The delay burns down until it reaches the detonator causing it to explode. The explosion of the detonator causes the main explosive charge to explode.

Rifle Grenade Model of 1915

Adopted in 1915, this rifle grenade saw extensive use during the First World War.

The body is cast iron with holes in both top and bottom. The bottom hole is threaded to accept a brass plug that



Rifle grenade Model 1915

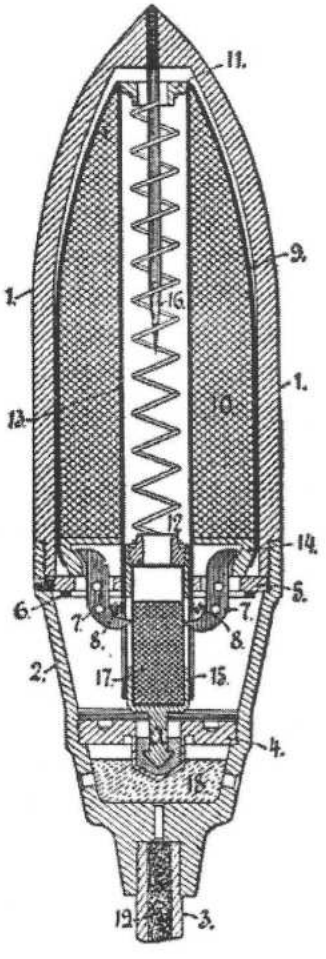
Rifle grenade Model 1915

TYPE- Fragmentation
WEIGHT- 530 gm
LENGTH- w/o rod 70 mm
FILLING- 85 gm
IGNITER- Impact
RANGE- 200 metres at 45 degrees

forms a socket for the launching rod. The top hole is threaded to accept the impact igniter. A launching rod, about 400 mm long, screws into a threaded socket in the bottom of the bottom plug.

The igniter mechanism is made of brass. The body has a nipple turned on the bottom end for the detonator to crimp onto. The bottom portion is externally threaded up to a flange that rests on the grenade body when the mechanism is fully screwed into the body. The top portion is internally threaded to accept the top cap. The body contains a striker with the point facing upwards and a creep spring on top of the striker. The top cap has a percussion cap mounted that faces the striker when the cap is screwed in. The percussion cap is a special design that produces a large flash when fired. A safety pin fits through the flanged portion of the body and the striker holding it in the safe position.

When the grenade is to be fired, the rod is inserted in the rifle barrel and a special launching cartridge containing 2.9 gms of rifle powder and a cork plug is loaded. When the safety pin is removed the creep spring ensures the striker is held off the percussion cap. The rifle is fired and the gases formed by the cartridge push on the launching rod forcing it out of the barrel. The grenade travels on its way to the target with both the force of launching and the creep spring ensuring the striker does not come in contact with the percussion cap. When the grenade strikes the weight of the striker overcomes the creep spring allowing the striker point to hit the percussion cap. The cap fires flashing down through the igniter body, past the striker until the flash hits the detonator. The ignition of the detonator causes the main filling of the grenade to explode shattering the body into fragments.



Mgebrov Rifle Grenade

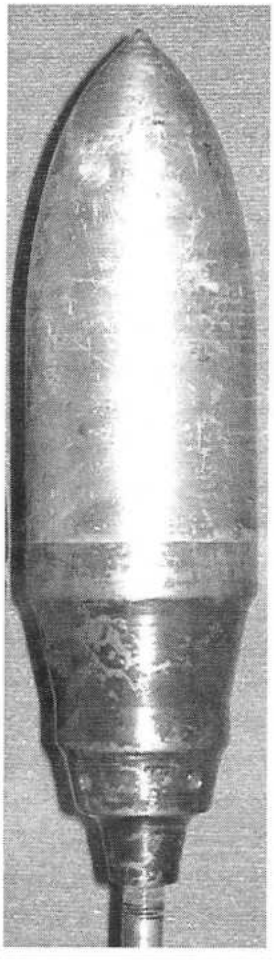
Mgebrov Rifle Grenade

This grenade, designed by Mgebrov, has several unique features. While it was complex and difficult to manufacture it had a "fool proof" safety feature in that the user was not required to remove anything prior to launch.

The upper body (1) has thick walls to provide the fragmentation effects. It is threaded at the bottom end to screw into the lower body (2). The striker (16) is fixed in place in the outer body extending down into the body. Contained within the upper body is a thin walled explosive container (9) with a central tube (13) running completely through the container and projecting from the bottom. The bottom of the container (14) is formed with a lip that curves inward. The container rests on a safety mechanism ring (5) that allows the central tube to protrude through it. The top of the central tube is closed by a guide (11). The igniter assembly consisting of a primer housing

Mgebrov Rifle Grenade

TYPE- Fragmentation
WEIGHT- 500 gm
FILLING- 60 gm
IGNITER- Impact

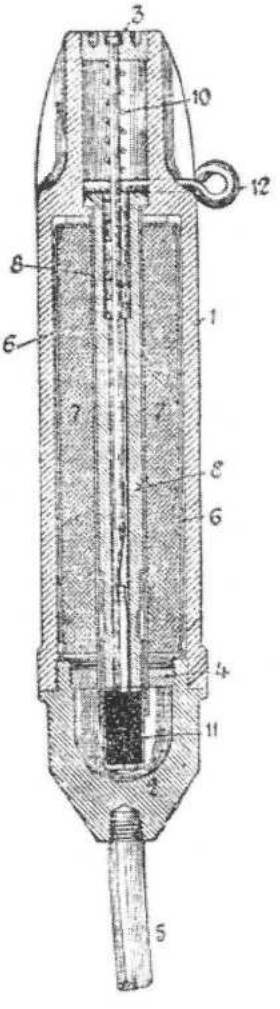


Mgebrov Grenade
Photo- N. Bonney

and primer, (12), detonator (17), and case (15) fits into the bottom of the tube. The case is formed with a short stem with barbed end on the bottom. Also contained in the central tube is an extended spring, attached to the guide at the top and the primer housing at the bottom.

The lower body has a threaded hole in the bottom to fit a hollow launching tube (3). There are air holes drilled around the body near the base. The upper end is threaded to screw onto the upper body. The safety mechanism (5) is fitted into the top of the lower body. Attached to the safety ring are two safety claws (7) with springs (8) to provide tension. A lower ring (4) with a cup in the middle screws into threads in the body about 1/3 up from the bottom. The cup is filled with fusible alloy that has the short stem from the detonator case embedded. Below the lower ring the body contains thermite(18). There is a flash hole drilled through the bottom into the top of the launching tube. The top of the launching tube is filled with an easily ignited compound(19).

When the rifle is fired, the flash from the launching cartridge travels up the launching tube and at the same time pushes the grenade off the rifle. The flash of the cartridge ignites the compound in the top of the tube which in turn ignites the thermite. As the thermite burns it melts the fusible alloy and frees the igniter assembly. At this point the explosive container is capable of moving slightly forward. When the grenade strikes the target, the explosive container moves forward. The safety claws, which are engaged in the bottom of the explosive container and in notches in the igniter assembly, are slightly rotated by the movement of the explosive container and the inward sloping lip on the bottom. This disengages the claws from the igniter casing. The extended spring in the central tube then retracts drawing the igniter assembly onto the striker. The striker hits the primer that then flashes into the detonator. The detonator explodes causing the detonation of the main filling.



Vintovochnaya Granata 2

Vintovochnaya Granata 2

It appears that this grenade was introduced in about 1915. There is little evidence that this grenade was extensively used.

The body is cylindrical with the firing mechanism centrally located. The main body contains the explosive bursting charge. The explosive cartridge is loaded into the body from the bottom and is held in position by the base piece. The top of the body is formed with four "wings" and has a closed well in the centre with the top portion threaded. The striker is mounted in a plug that screws into the top of the well. A creep spring is slipped over the striker. The detonator assembly is a turning that has a lip at the top end and has the detonator mounted at the bottom end. The top has a blind hole that fits the creep spring and a smaller hole through the centre to fit the striker. The safety pin fits through the side of the grenade near the top of the body, just above the lip on the detonator assembly. The base piece screws onto the main body and contains the detonator. The base piece is closed by a guide nut prior to being

Vintovochnaya Granata 2

TYPE- Fragmentation
WEIGHT- 630 gm
LENGTH- 158 mm w/o rod
FILLING- 20 gm
IGNITER- Impact

screwed into the body. A hole in the centre of the nut allows the detonator assembly to fit through. The launching rod screws into the base piece and has a copper gas check at the bottom.

The safety pin passing through the body holds the detonator assembly in position. When the grenade is about to be fired, the safety pin is removed freeing the detonator assembly. The creep spring continues to hold the assembly in position until firing. When the grenade is fired, the force of firing and the creep spring combine to hold the detonator assembly down. When the grenade hits the ground or target, the detonator assembly continues to move forward overcoming the resistance of the creep spring. When the detonator at the bottom end comes into contact with the stationary striker, it fires and causes the explosion of the main filling.

Chemical Grenade Model of 1917

Chemical Grenade Model of 1917

This grenade was adopted for use in 1917. It is a gas grenade based on the M1912 grenade. It was used in the later stages of the First World War and continued in use into the Second. The Germans designated captured stocks of the grenade "Gashandgranate 351(r)".

The body is a sheet steel casing containing a poison gas compound. The body is cylindrical with the top and bottom rolled and seamed on. A conical metal socket is attached to the bottom of the body and is soldered to a sheet metal handle. A belt hook is soldered onto one side. The striker assembly is soldered to the side of the body opposite the belt hook. The striker mechanism consists of a barrel, long striker with a nail head at the bottom, and striker point at the top end. A striker spring surrounds the striker. A trigger handle is attached to the striker through a slot in the barrel. A safety slide is attached to the igniter so that the safety slide will block the movement of the striker when slid into the safe position. A catch is attached to the top near the edge with the igniter mechanism. A clip to hold the fuze is also attached to the top and engages the catch. A hole in the top of the body has a detonator thimble soldered in. A sheet metal arming handle is fitted into a slot in the handle and is held in place by an axis pin. A spring is located under the handle to provide tension. A notch on the handle engages the nail head of the striker mechanism when it is cocked. A safety ring fits over the handle and rests against a small stop on the back of the handle. The safety ring holds the handle against the tension of its spring ensuring that the notch remains engaged with the striker.

The fuze consists of a square "U" shaped body with a small primer at one end of the "U". The other end is fitted with the detonator. A time fuze runs from the primer to the detonator through the hollow body.

Chemical Grenade Model of 1917

TYPE- Gas
WEIGHT- 836 gm
LENGTH- 246 mm
WIDTH- 66 mm
FILLING- 484-519 gm Chloropicrin

The grenade is unpainted or painted grey and has a triangular plate stamped with a skull and crossbones, attached to the side. Also stamped into the plate the the word "chemical" in Cyrillic lettering.

For use the grenade must first be primed. The clip on top of the grenade

must be disengaged from the catch and the fuze inserted with the detonator in the detonator thimble and the primer end fitting into the top of the striker mechanism. The clip is then rotated over the fuze and clipped into the catch which retains the fuze in position. When ready to throw, squeeze the sheet metal handle into the handle against the pressure of the spring and remove the safety ring. Pull out the safety slide and throw the grenade. Once the grenade leaves the hand, the sheet metal handle is free to rotate outwards propelled by the spring. As the handle rotates, the notch is pulled away from the nail head of the striker freeing the striker. The striker under pressure from the striker spring moves upward and hits the primer in the fuze. The primer fires and ignites the delay fuze, the fuze burns down until it reaches the detonator and sets it off. The detonator bursts the body of the grenade and spreads the contents.

Incendiary Grenade Model of 1917

In 1917 an incendiary grenade modeled on the Model of 1914 grenade was developed. This grenade did not get widely distributed during the war.

The body is virtually identical to the high explosive grenade it was developed from. The main difference is the filling. The filling was thermite with an ignition pellet having three layers. The bottom layer is 8.5 grams of a mixture of 77% Barium Nitrate, 17% aluminum powder and 6% Lithographic drying oil. The middle layer is 2.1 grams of 70% of the first compound mixed with 24 % black powder and 6% Lithographic drying oil. The top layer is .5 grams of a black powder paste. The object of the three layers is initiate rapid ignition of the pellet from the delay fuze with an increasing intensity of burn to ensure the thermite filling is ignited.

Operation is exactly the same as the Model of 1914. Once ignited the thermite burns with an intense heat that will seriously damage major equipment. Thermite grenades are most effective when placed in position to destroy equipment.

40.6 mm Fragmentation shell

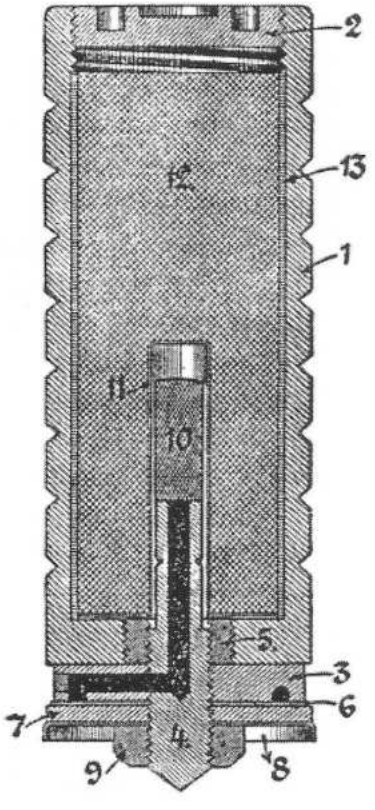
This grenade is designed for use with the smoothbore 40.6 mm Discharger cup attached to the Mosin Nagant rifle.

The body (1) is cast iron made in a cylindrical form with segmentation on the outside. It is internally threaded at the top and is closed by a screw plug (2). A paper wrapped (13) explosive charge (12) is inserted through the top prior to being closed. The bottom of the body has a smaller hole threaded to fit a plug (5) that has a smaller threaded hole in it. A detonator well (11) is centred in the bottom in line with the hole. The detonator (10) is inserted into the well. A tube housing (4) is threaded to match the threading in the bottom plug and is screwed into the plug holding the detonator in place. The time delay fuze is inserted into the tube housing coming out a hole near the bottom. A time delay ring is then screwed onto the projecting tube with the delay fuze projecting into it and being curled around within the ring. A cloth washer (6) is then placed on followed by a copper washer (7). Finally a sheet metal gas check (8) is placed on and the whole thing held together by a nut (9).

The delay can be adjusted by turning the

40.6 mm Fragmentation shell

TYPE- Fragmentation
WEIGHT- 550 gm
DIAMETER- 40 mm
LENGTH- 115 mm
FILLING- 75 gm
IGNITER- Delay
FUZE DELAY- Variable
RANGE- 420 metres

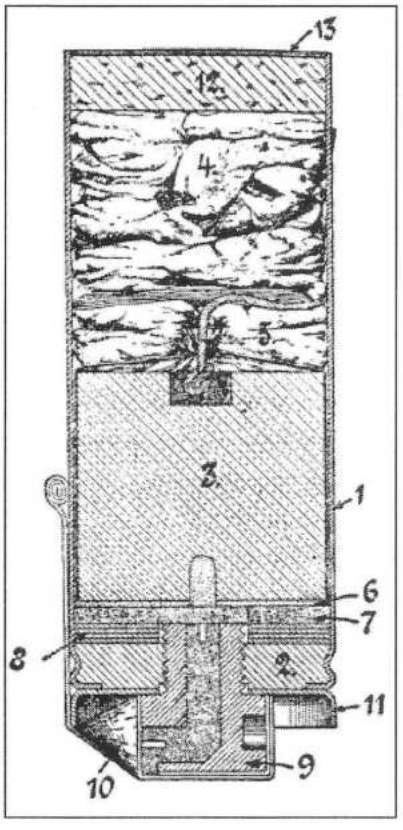


40.6 Fragmentation Shell

time delay ring which exposes a different part of the delay fuse to the flash of the projecting cartridge via a hole in the bottom of the grenade. If a shorter delay is required the delay ring is moved so that a portion of the fuze closer to the detonator is exposed to be ignited by the launching cartridge. When the delay time has been set, the grenade is loaded into the discharger cup. A launching cartridge is loaded in the rifle, the rifle aimed at the target and the rifle fired. The flash from the cartridge is sufficient to ignite the exposed time delay fuse. At the same time, the gases formed by the launching cartridge push the grenade out of the discharger cup. As the grenade travels through the air, the delay fuze burns down until it reaches the detonator and causes it to explode. When the detonator explodes it causes the main filling to detonate. The explosion of the filling causes the body to burst into fragments.

40.6 mm Illumination shell

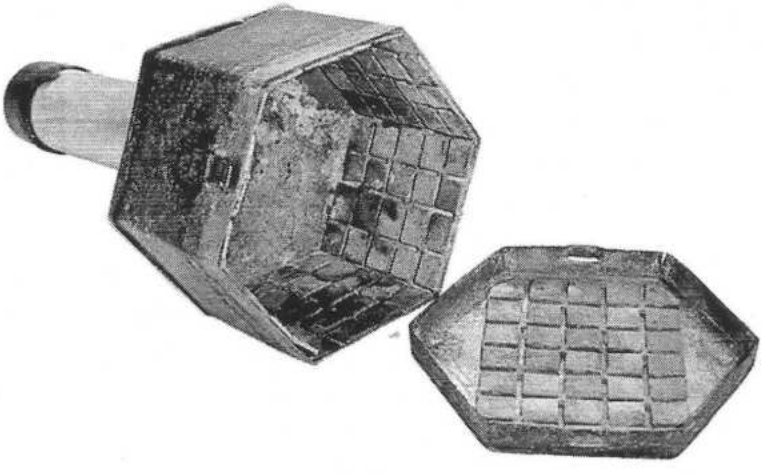
1- Sheet metal body
2- Base
3- Flare
4- Parachute
5- Suspension cord
6- Disc
7- Expelling charge
8- Spacers
9- Base plug
10- Waterproof covering
11- Gas check
12- Cork disc
13- Seal



40.6 mm Illumination shell

This is an illumination parachute flare designed for the smoothbore 40.6 mm discharger cup fitted to the Mosin Nagant rifle.

The body of the flare is constructed of sheet metal. The base is a heavy steel or iron disc with the sheet metal walls of the body crimped into a groove in the disc. There is a threaded hole in the centre of the base. A plug that screws into the hole forms the delay and igniter mechanism. When the plug is screwed in, it holds a sheet metal gas check on as well. The shell is loaded first with several spacers that level the base off with the top of the igniter plug. An expelling charge



Hexagonal Grenade

is then placed in with a separation disc and the flare on top. The suspension cords and parachute are loaded on top of the flare. The entire load is then covered by a cork disc and the top of the shell sealed. The igniter plug in the base has a blind hole drilled from the top into a hole drilled in the side. The channel formed through the disc is filled with the delay element. The base is covered with a piece of water resistant paper or tape.

When the shell is loaded into the discharger, the covering is removed from the base which exposes the delay element. When the rifle is fired, the gases from the launching cartridge force the grenade out of the discharger and the flash from the cartridge ignites the delay element. The delay element burns through during flight until it reaches the expelling charge. The expelling charge fires and forces the flare and parachute out of the body. As the expelling charge fires, it also ignites a short delay in the flare. When the flare delay fires it ignites the flare, which by the time it ignites is far enough away from the parachute so it will not ignite it.

Hexagonal Grenade (Designation Unknown)

This is believed to be a theatre made Russian grenade from WWI. No documentation has come to light up to now. These grenades have only been found on the Russian front giving the impression that they are Russian manufacture. The grenade head is made of sheet metal in a hexagonal form. The top lid of the grenade is held in place by two strips of metal attached to the head that fit through slots formed in the lid. When the grenade is filled the strips are turned down to lock the lid in position. The grenade is lined with sheets of perforated sheet metal to provide fragmentation effects. The fragmentation liner is perforated in a square pattern. The filling may be a Pyroxiline demolition charge that was in use by the Russians at the time. A socket is attached to the bottom of the head to hold the handle. The wooden handle has a hole drilled lengthwise to fit a friction igniter. A cap on the bottom of the handle has holes in the bottom to allow the pull wire from the igniter to protrude. There is a small piece of dowelling attached to the wire to form a "pull" for the igniter. The igniter is attached to a piece of safety fuze to provide a delay, and a detonator at the end of the fuze to initiate the main explosive charge. The detonator fits into the head through a hole in the centre of the socket.

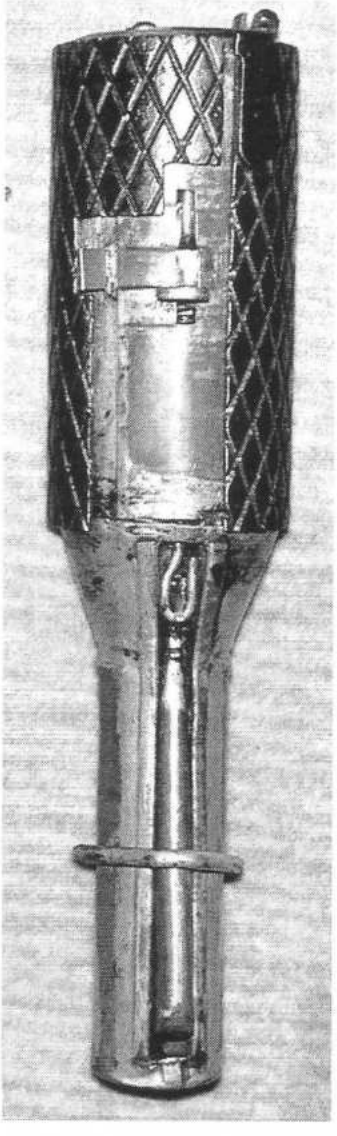
Ruchnaya Granata 1914/30

This grenade is in fact the 1914 grenade with several modifications introduced in 1930. It continued in use up to about 1941 when stocks were exhausted.

Modifications were made to the mechanism and a fragmentation sleeve developed that could be fitted to the grenade. The modifications to the mechanism were designed to simplify manufacture. The modifications included changes to the striker and arming handle. The bottom end of the striker was changed from a nail head to having the striker bent to form an eye at the end. The handle was modified to have a hook that fit the eye on the striker rather than a notch to engage the nail head type striker. The spring under the handle was also

Ruchnaya Granata 1914/30

TYPE- Offensive/Defensive
WEIGHT- 580 gm w/o frag sleeve
780 gm w/ frag sleeve
DIAMETER- 45 mm
LENGTH- 235 mm
FILLING- TNT 320 gm
IGNITER- Percussion
FUZE DELAY- 3.5-5 sec.
EFFECTIVE RADIUS- w/o frag sleeve, 20 to 25 metres, w/ frag sleeve up to 100 metres



Ruchnaya Granata 1914/30
Photo- John Roks

VGD Rifle Grenade

TYPE- Fragmentation
WEIGHT- 350 gm
DIAMETER- 40.6 mm
LENGTH- 117 mm
FILLING- TNT 49.8 gm
IGNITER- Delay
FUZE DELAY- 3 - 12 sec.
EFFECTIVE RADIUS- 50 metres

changed from a spiral spring to one made of spring steel.

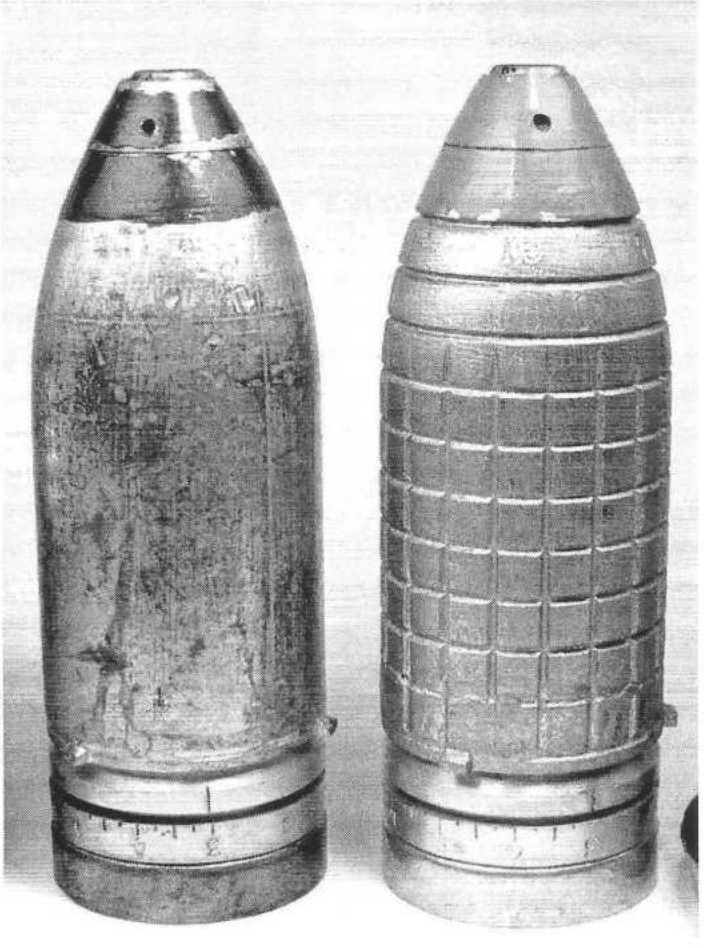
The fitting of a fragmentation sleeve allowed its use both as an offensive or defensive (fragmentation) grenade. The fragmentation sleeve is made of steel plate with external segmentation in a diamond pattern. It has a small belt clip welded to it that incorporates a retaining clip. The retaining clip engages in the clip on top of the body and is held in place by the detonator retaining clip. Use of the fragmentation sleeve increased the effective radius of the grenade up to 100 metres.

Instructions for use are exactly the same as the Ruchnaya Granata 1914.

Vintovochnaya Granata Dyakonova (VGD)

This grenade was designed in the 1930's for use with a rifled cup discharger attached to the standard Mosin-Nagant rifle. It follows a pattern similar to that used by several countries during the First World War in that it is fired using a ball cartridge instead of a special grenade launching cartridge.

The body is steel and is shaped like a small artillery projectile that has external serrations to increase fragmentation effects. Examples with and without segmentation have been noted but smooth bodies are rare. The central tube for bullet passage is threaded on both ends. The top end of the tube is held in place in the body opening by a threaded brass plug that also serves as a closing plug for the high explosive filler. The brass plug is screwed down into the body so it fits flush with the grenade body. A steel cap is then threaded onto the tube securing it in place and forming the tip of the shell. The base plate of the body has a filling hole closed by a screw plug and a tube running up into the body that houses the delay detonator. There are also three small studs on the plate that project about 1.5 mm out from the main body that engage the rifling in the discharger cup. A powder train time delay fuze slides over the rear of the tube and is held in place by a threaded lock nut. The main body of the fuze is made of two pieces of aluminum. The upper portion contains the black powder time ring. The lower section which is moveable has the time delay setting indicators. A delay of 3-12 seconds is possible. The base of the fuze assembly is a thin walled steel cup that acts as a gas check.



VGD Rifle Grenades
Early version on left, later version on right.
Photo- Alex Diehl

When the rifle is fired, the bullet passes through the central tube of the grenade. The propellant gases produced by the cartridge are trapped in the cupped base of the grenade. The thin walls of the cup are pushed out forming a seal against the side of the

Ruchnaya Granata F1
with Koveshnikov fuze
Photo- Ed Strazdes

discharger cup. At the same time the gases launch the grenade from the barrel of the discharger and the flash from the propellant ignites a compressed powder charge in the ignition opening on the base of the fuze assembly. The compressed powder charge transfers flame to the black powder time delay train. When this burns down to the point where the time setting ring is aligned with the detonator tube in the grenade body, a detonator delay element is ignited which in turn causes the detonator to explode igniting the main bursting charge.

The grenade may be fired with either a standard 7.62mm ball cartridge or with the addition of a supplemental propellant charge. When fired with just the cartridge a muzzle velocity of 54 metres per second is achieved. The supplemental charge is simply a small silk bag filled with 2.5 grams of smokeless powder that is placed in the base of the grenade prior to loading. In this case the flash from the cartridge ignites this powder that imparts an extra push to the grenade providing a muzzle velocity of 110 metres per second and a much longer range that would be possible otherwise. The compressed powder charge is ignited by the burning supplemental charge. The grenade is fired from a cup discharger that fits over the muzzle of the standard rifle. When the grenade is loaded the three studs engage in grooves in the discharger to provide a spin to the grenade on launch. The spin acts to stabilize the grenade in flight. The noted range of the grenade is 300 metres but can be extended to 900 metres with the use of the supplemental propellant charge.

Ruchnaya Granata F1

The Russian F1 grenade was developed prior to WWII from the French F1 of WWI. During the First World War, the French supplied the Russian army with F1 grenades fitted with the Model 1915 percussion igniter. The Russians copied the body of the French grenade but fitted it with a fuze mechanism designed by F.V Koveshnikov in 1931. During WWII the UZRG fuze mechanism was designed and replaced the Koveshnikov fuze mechanism. Post war it was fitted with the UZRGM and there is evidence to indicate it has now been fitted with the UZGRM-2 fuze mechanism. The Russian F1 grenade has a long service life ranging from about 1931 to current. Only the British Mills bomb has served for a longer period. The F1 can still be found in service throughout the world. It has been produced in a number of Warsaw Pact countries including, but not limited to, Russia, Poland, East Germany, and Bulgaria and may remain in production in some.

Ruchnaya Granata F1

TYPE- Fragmentation
WEIGHT- 600 gm
HEIGHT- total 125 mm
Body- 85 mm
DIAMETER- 55 mm
FILLING- 60 gm TNT
IGNITER- Koveshnikov, UZRG, UZRGM, UZRGM 2
FUZE DELAY- 3.2- 4.2 sec. Normally

The body is made of cast iron with external segmentation. The actual body shape has been refined from the original but retains the same basic configuration. A hole in top of the body is threaded to fit the

Ruchnaya Granata F1
with UZRGM fuze
Photo- Ed Strazdes

fuze mechanism. Early bodies have a rounded base with filling plug, later bodies have a flat base and no filling plug. The sides are externally segmented with four rows of fragments. The body is filled with an explosive charge of 60 grams of TNT.

The grenade is normally found painted in the particular Soviet olive green but examples have also been noted painted in colours ranging from light green to dark brown color. Normally the only markings on the body are a cast in number on one segment and a cast in letter on another. The number is likely a mold number and the letter possibly a factory but this information is not confirmed.

Initially the grenade was issued with a transit plug in the fuze well and the fuze mechanisms issued separately. Now it is normally issued primed and ready for use.

For use, take the grenade in the throwing hand and holding the safety lever against the body, pull the safety pin out and throw the grenade. The fuze mechanism, whichever type, will operate and cause the grenade to explode after a delay of 3.2 – 4 seconds. Being cast iron the body will shatter into fragments with some fragments dangerous out to 200 metres, but the effective radius is only 20 metres. Typically the body shatters into a few large fragments, some medium and small fragments and some cast iron dust. This is normal with most cast iron grenades that are segmented on the outside.

Ruchnaya Granata F1 (Instructional)

There are instructional F1 grenades that have been produced for use in classroom instruction. These take the form of a sectioned F1 grenade. These are sometimes found in a training kit, but may also be found without the kit.

The body has a ¼ section cut out of it and the body is filled with an inert filler to represent the filling. The normal detonator well is formed in the inert filling and the entire surface varnished. An inert UZRGM fuze mechanism is then screwed into the grenade to complete the grenade. The igniter mechanism is not sectioned. The outer body of the grenade is painted a bright green, the cuts in the body are painted red, and the filling painted yellow.

Uchebnaya Ruchnaya Granata Oboronitelnaya (URG)

The URG is the practice version of the F1 grenade. The grenade is used in training to simulate the use of a live grenade and to practice troops in the use and functioning of the F1 grenade.

This takes the form of a normal F1 body with a large hole drilled through the bottom to allow gas and smoke escape. A practice UZRGM fuze mechanism fits into the threaded hole in the top of the grenade.

URG

TYPE- Practice
WEIGHT- 600 gm
HEIGHT- Total 125 mm
Body- 85 mm
DIAMETER- 55 mm
FILLING- practice charge
IGNITER- UZRGM practice
FUZE DELAY- 3.2- 4.2 sec.

The practice fuze is made in the same basic manner as a UZRGM fuze mechanism. The striker mechanism is the same but has a longer striker. Where the detonator would normally screw into the bottom the practice fuze has an adapter bushing. The adapter bushing is externally threaded at one end to

URG
Photo- Ed Strazdes

screw into the striker mechanism. The other end is internally threaded to accept the practice charge. Two holes are drilled through the adapter to allow gas escape. The practice charge has a percussion cap mounted in the top end, which is threaded to screw into the adapter bushing. A time delay fuze runs through the body down to a smoke charge at the bottom end.

The body, striker mechanism, and adapter bushing are all reusable. The striker itself is normally replaced. To reload the grenade, unscrew the expended practice charge. The adapter bushing is then removed taking care to retain the spring and washer. Using a special drift, which is supplied on a ratio of one to every four grenades, insert the new striker in the end of the drift. Put the washer and spring onto the striker and insert the entire assembly into the housing. Push up until the head of the striker passes through the guide washer. Replace the safety lever and pin. Screw the adapter bushing back into the bottom and put a new practice charge in place. The assembled mechanism can then be screwed back into the body.

The grenade is painted black with white markings. There are markings around the neck of the body and a white line painted around the centre of the body and also two vertical lines opposite each other in the depressions formed by the external segmentation of the body. Markings around the neck give the designation and lot number.

Ruchnaya Granata Dyakonova 1933 (RGD 33)

The RGD 33 is a dual-purpose grenade adopted for use in 1933. Designed by Dyakonov it has a complicated mechanism that contributed to its downfall.

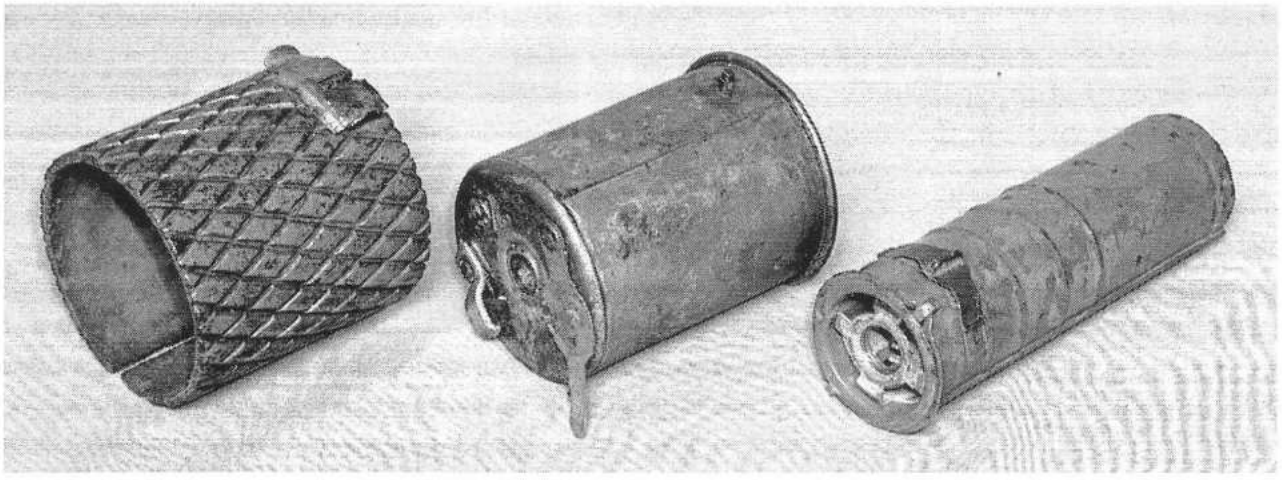
The main construction is all of sheet metal stampings. The explosive head is basically a tin can. The top is constructed of a heavier gauge metal attached so there is no rim. The bottom is of a thinner gauge metal formed in a convex shape and is seamed on in the normal manner. The head is lined with a metal belt coiled in three to four layers to provide a light fragmentation effect. A tube runs completely through the head and is closed by a sheet metal cover mounted on the top of the head. The bottom of the tube protrudes from the head and is threaded to hold the handle. A washer formed to make a ratchet fits over the protruding tube and is held on by a thin nut. A 3 mm pin protrudes from the side of the body. The fragmentation sleeve is constructed of heavy gauge steel with a diamond pattern cut into the outer surface to aid in fragmentation. The sleeve has a slot formed in the side with a sheet metal locking catch welded over it. The sleeve fits over the top of the head; the slot engages the protruding pin and the locking catch holds it in place.

RGD 33

TYPE- Offensive/Defensive
WEIGHT- wo/fragmentation sleeve 500 gm
w/fragmentation sleeve 750 gm
DIAMETER- wo/fragmentation sleeve 54 mm
w/fragmentation sleeve 62 mm
LENGTH- Total 186 mm
Main body 75 mm
FILLING- 85 gm TNT
FUZE DELAY- 3.2 – 4 sec.

The igniter mechanism is contained within the handle. The handle is constructed of two sheet metal tubes, one fitting inside the other. The outer tube is open at the top end, closed at the bottom and has five ridges formed on the upper half to aid in gripping the handle. A slot is located near the top of the tube for

RGD 33
Photo- Ed Strazdes

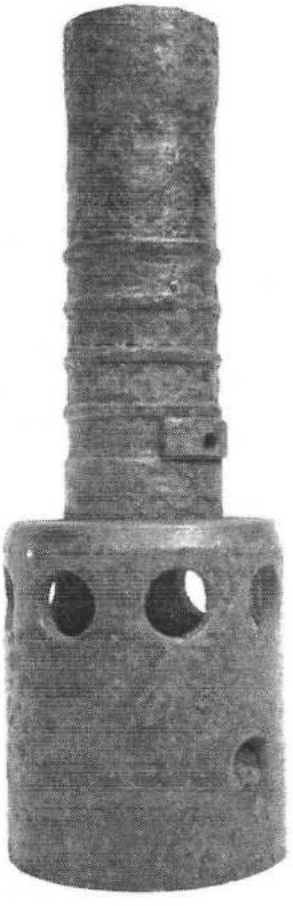


RGD 33 separated into component parts
Photo- Ed Strazdes

the safety catch. The inner tube is open on both ends and contains the remainder of the igniter mechanism. Contained in the inner tube is an arming clip with striker mounted, an operating spring, insert, and fuze safety. The arming clip is attached to the upper end of the outer tube. The insert is formed of sheet steel and has a threaded hole in the top to screw onto the head of the grenade. The walls of the insert have two slots, a short one that angles off centre and a long one that runs up the centre. Notches in the slots are placed so that the lug on the safety catch will engage them. The insert is fixed into the top of the inner tube over the arming clip with the arming clip riding in the slots. The safety catch has a lug on the back that fits through the outer tube into the inner tube and insert riding in the slots. The lug engages the notches to hold the grenade in the safe position. The fuze safety is located inside the insert and prevents ignition of the fuze if it is incorrectly primed with a released striker. The operating spring is attached to the bottom of the inner tube and bottom of the outer tube. The detonator assembly consists of a percussion cap, delay element, detonator, and booster.

The grenade is painted green with a red mark under the safety catch which shows when the safety catch is off but is covered when it is engaged. There are embossed markings on the top of the head and on the handle.

The grenade is issued uncocked and with the detonator assembly separated from the grenade. For use it must be primed. To prime the grenade, slide the safety catch fully to the left. Hold the head in one hand and the handle in the other, then pull the handle to the rear and turn it to the right. Push the handle forward until it stops and slide the safety catch back to the right. Open the cover in the top of the grenade and insert the detonator assembly with the primer down. When the detonator assembly is pushed fully home the end pushes on the fuze safety pushing it out of the way. If the grenade is not cocked, the fuze safety will not push out of the way. Close and lock the cover over the end of the detonator assembly. The grenade is then primed and ready for use. At this point, the outer tube is held slightly down on the inner tube indicating a cocked grenade.



RGD 33 Training
Photo- Bernt Bosman

For use, slide the safety catch to the left exposing the red mark. Throw the grenade with a forceful throw. When the grenade is thrown, the outer handle moves back from the head stretching the operating spring and moving the arming clip along the angled slot in the insert. When the handle reaches its full rearward movement the arming clip aligns itself with the long slot. At this point, the operating spring takes over and pulls the outer tube back onto the inner tube. The arming clip moves along the long slot under pressure of the spring until the striker hits the percussion cap. The cap fired and ignites the delay element that burns down to the detonator. The detonator fires and initiates the booster causing the main charge to explode.

RGD 33 Training Grenade Disassembled
Photo- Paul Spence

RGD 33 Training (Designation Unknown)

RGD 33 Training
TYPE- Practice
DIAMETER- 60 mm
LENGTH- 170 mm
FILLING- Practice Charge
FUZE DELAY- 3.2 – 4 sec.

This is a training version of the RGD 33 that is made of a heavier material to prevent damage in practice use. The head is constructed of 3mm steel plate. There are eight 13mm holes around the base of the head. A depression about half way up the head appears to be designed to retain a smoke and sound charge. The handle is also made of a heavier material to withstand repeated use. A bolt opposite the safety catch is used to disassemble the handle. The bottom of the handle unscrews and allows the inner mechanism to be removed and recocked for repeated use.

The practice grenade is used in the same manner as a live grenade. All actions required to arm the live grenade can be practiced. Operation is similar to the live grenade with the exception that the safety catch will only lock the handle if the grenade is cocked.

RPG 41vk

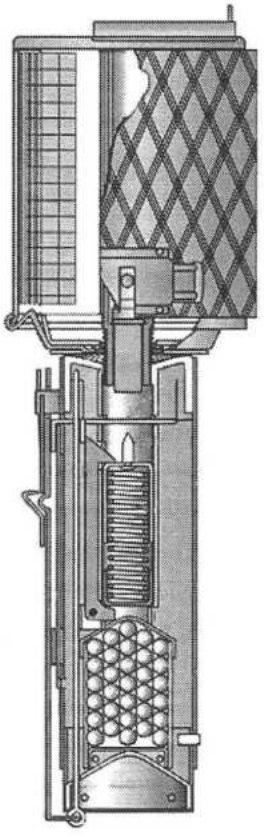
RPG 41vk
Type- Anti tank
DIAMETER- 92 mm
LENGTH- 240 mm
FILLING- 1 kg.
FUZE DELAY- 3.2-3.8 sec.

There are references indicating that a demolition/anti tank version of the RGD 33 was used on the North Western (Leningrad) front. A larger explosive container was mounted on the handle of the standard RGD

RPG 41vk

33. The head of this version contained approximately 1 Kg of explosive. The grenade was armed in the same manner as the RGD 33 but with the larger head the detonator set would by necessity be longer.

RGU 38



RGU 38
Original Diagram by
Evgeny Kravchenko

There were experiments conducted to develop an impact grenade. The first appears to be the RGU 38 which is similar in appearance to the RGD 33. They were offensive/ defensive grenades utilizing a fragmentation sleeve which is to all appearances the same as that used on the RDG 33. This grenade was only made in experimental quantities.

The grenade has an explosive head screwed onto a sheet metal handle. The only apparent difference in the head from that of the RDG 33 is the method of retaining the detonator assembly. The RGU 38 has a slide assembly to retain it, rather than a rotating cover. The major differences are in the igniter assembly located in the throwing handle. The RGU 38 has a smooth handle containing a central tube. The central tube contains a striker held in the cocked position by a catch. The lower portion of the handle contains a weight. Along one side of the handle is a piece of spring steel, attached so that when released the top end springs away from the handle. Just above the top of the spring is a slot in the handle and central tube for a safety bar. A small bracket is attached to the handle just above the slot. The safety bar is constructed with a lip on one end. It fits into the handle through the slot into the central tube creating a positive safety that blocks the travel of the striker. The lip on the safety bar engages the end of the spring steel and when pushed fully into the handle holds the spring steel against the handle. The safety lever is made to conform to the shape of the handle and has a hole at the top end to fit over the small bracket. A long pin is attached to the bottom end. The long pin fits into the handle through the bottom and runs almost the full length of the handle until it fits through a hole in the safety bar. This retains the safety bar in place. Once the pin is in place the lever fits closely against the handle with the small bracket fitting through the hole in top of the lever. A small bar of spring steel then fits into the bracket to hold the handle against the body. A groove formed into the bar and a corresponding "bump" stamped into the handle retains the bar in place.

When the grenade is to be used, it must first be armed by pushing the slide assembly back and inserting a detonator set. Once the detonator is in place the slide is pushed back into position retaining the detonator in place. The grenade is now armed and ready for use. When the grenade is to be thrown, lift the bottom of the safety bar and pull down to disengage it from the bracket while holding the lever against the handle. When the grenade is thrown, the lever moves slightly away from the body disengaging from the bracket. The inertia of throwing and the air forcing against the handle as the grenade travels cause it to withdraw the long pin disengaging from the safety bar. Once the safety bar is disengaged the spring steel on the handle can spring out from the handle forcing the safety bar out at the same time. This removes the positive safety. When the grenade impacts the target, the weight moves forward against the bottom of the catch holding the striker. The weight forces the catch to rotate and disengage the striker. The striker under the influence of a spring is forced forward into a percussion cap in the detonator set. The percussion cap fires into the detonator causing it to explode. The explosion of the detonator sets off the main bursting charge.

RGU 39

This is also an experimental impact grenade based on the RGU 38 made only in experimental quantities.

The impact igniter is the same as used with the RGU 38, but the head of the grenade has been modified. The head is still cylindrical in shape but both ends are closed with short truncated cones. The cover to hold the detonator assembly in place is a hinged and made of spring steel. The attachment of the fragmentation sleeve has also been changed. A spring steel clip is attached to the side of the sleeve and has a hole at the bottom end that fits over the pin on the body. This arrangement ensures a very positive attachment of the fragmentation sleeve to the grenade but also allows it to be removed easily.

RGU 40

This is an experimental impact grenade that is a complete departure from the RDG 33 style grenade. Only made in experimental quantities, this version led to the final development of the RGU.

The body is basically egg shaped with five grooves around the centre. The top of the body unscrews to allow the fitting of internal components. The cap has a hole in the middle used to prime the grenade and is closed by a plug. The bottom end has lugs cast onto one side that acts as fixing point for the safety pin. Internally there are two explosive containers with a tube through the centre of both. The bottom container holds the striker mechanism, the upper acts as the detonator holder. The striker mechanism is held within a small tube slightly longer than the explosive container. The tube has two holes at the bottom end and larger holes at the top end. The striker has a groove formed at the bottom end and a point at the other. The striker and spring fit into the tube and are held in the cocked position by two small balls that fit into the groove and lower holes in the tube. Once the striker tube is put into the tube in the explosive container the walls of the tube hold the balls in place. A safety plate constructed from a sheet metal plate formed to fit the curvature of the body and a rod with two leaf springs. The two springs fit along the length of the rod. The bottom end of the plate has a section formed to fit between the lugs on the bottom of the body to be held by a safety pin. The rod fits through a hole in the side of the grenade passing between the two explosive containers and through the upper holes in the striker tube. This holds the explosive containers apart and blocks the travel of the striker. The detonator assembly consists of a detonator with primer mounted in the open end.

The grenade is primed by removing the plug at the top, inserting a detonator assembly primer down, and replacing the plug.

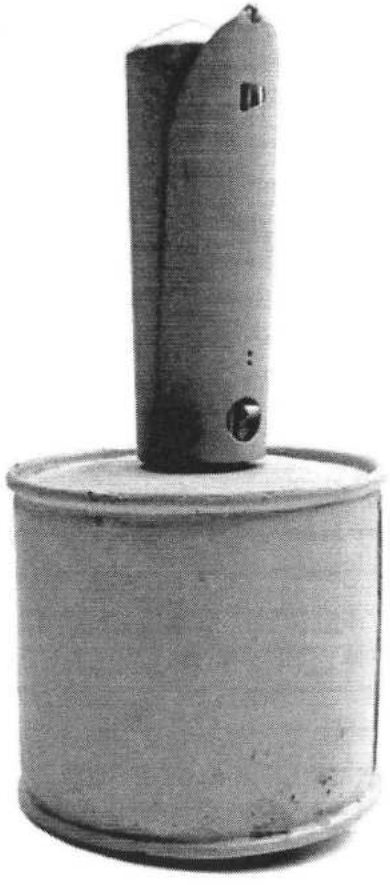
When the safety pin is removed the safety plate is held in position by the throwing hand. When the grenade is thrown the action of throwing and the air passing between the body and safety plate cause it to withdraw from the body. The springs retard the removal slightly to ensure the grenade travels a safe distance before arming. Once the rod fully withdraws from the body, the safety plate falls away and the grenade is armed. At this point the only thing holding the explosive containers apart is the striker tube. When the grenade impacts, the lower explosive container moves on the striker tube toward the upper explosive container. Once the lower explosive container moves up, it releases the small balls that then fall away and release the striker. The striker travels up the tube until it hits the primer. The primer flashes into the detonator causing it to explode and set off the main explosive filling in the upper container. Sympathetic detonation of the lower container follows the explosion of the upper container.

Ruchnaya Protivotankovaya Granata 40

TYPE- Anti Tank
WEIGHT- 1125-1200 gm
DIAMETER- 99 mm
LENGTH- Total 196 mm
Head 86 mm
Handle 110 mm
FILLING- 740-760 gm TNT/Trinitroxilol
or TNT/Amonium Nitrate (40/60)
IGNITER- Impact
PENETRATION- 20 mm

Ruchnaya Protivotankovaya Granata 40 (RPG 40)

At the beginning of WWII the Russians had little to no effective infantry anti tank capabilities. In an attempt to address that shortfall, the RPG 40 anti tank grenade was designed by M. I. Pusirev. Relying solely on the blast effects of a large explosive



RPG 40
Note safety pin is missing
Photo- Bernt Bosman

charge to defeat armour, this grenade was effective against lightly armoured or soft skin vehicles but against more heavily armoured vehicles it was ineffective. It would have been particularly useful when used against bunkers or dug in positions.

The head, or charge container, was simply a large sheet metal can containing a large explosive charge. A central tube, forming a fuze well, runs through the centre of the head to a threaded nipple on the bottom. A sheet metal cover closes the top of the fuze well. The handle contains the igniter mechanism. The handle itself is a sheet metal tube closed at the top end by a flange with threaded hole in the centre. A tube is fixed to the adapter inside the handle. A punch out near the top end of the handle serves to retain the deploying strip when in place. The deploying strip is a sheet metal strip, formed to fit closely to the handle. A hole in the strip fits over the punch out in the handle and is retained by the safety pin. Two small holes are located just below the upper hole to secure a safety wire that feeds through a small hole in the handle just below the punch out. The bottom end of the strip has a punch out forming a tab and a small hole at the very bottom with a wire needle attached.

The striker mechanism consists of the striker, striker spring, moveable tube with a stop, stop loop, needle loop, weight, and two balls. The striker is formed with a groove to retain the balls. The striker is housed within the movable tube with the striker spring between the striker and stop. The moveable tube is necked down at about the half way point and has three holes in the necked down portion. A sleeve is fitted over the end of the necked portion of the tube to bring the size of the tube back to the same diameter as the larger end and act as a guide. The two balls fit in the two holes in the movable tube and in the groove of the striker to retain it in position; the balls are prevented from dropping out by the fixed tube. A fixed pin fits through the large end of the tube forming a stop. A wire loop is fixed to the stop. A weight fits in the end of the tube and is held in place by the end cap of the handle.

For use the grenade must be primed, it is stored with the igniter mechanism cocked, but the detonator assembly is separated from the grenade. To prime the grenade, open the cover on the top of the body, ensure it is clear and insert the detonator assembly with the percussion cap facing down. Insert the assembly fully into the body until the cover can be closed and locked. The grenade is then ready for use. When ready to throw the grenade, pull the safety pin out holding the deploying strip against the handle. Throw the grenade, as the deploying strip falls away, it pulls the safety wire out of the front part of the handle. When the deploying strip continues to trail behind the grenade, the wire needle is withdrawn from the handle releasing the moveable tube. The impact igniter is then armed. When the grenade strikes the target, the weight forces down on the moveable tube pushing it further into the fixed tube. As the balls come into line with ports in the fixed tube, the striker under pressure of the striker spring forces the balls out and allows the striker to fly forward under pressure to hit the percussion cap of the detonator assembly. The percussion cap fires initiating the detonator. When the detonator explodes it causes the main explosive charge to explode.

Ruchnaya Protivotankovaya Granata 41 (RPG- 41)

The RPG41 was designed for use against armoured vehicles and light tanks with armour thickness up to 25 mm.

Ruchnaya Protivotankovaya Granata 41

TYPE- Anti Tank
WEIGHT- 2000 gm
DIAMETER- 125 mm
LENGTH- Total 200 mm
Head 90 mm
FILLING- 1400 gm TNT/Trinitroxilol
or TNT/Amonium Nitrate (40/60)

It was also used against heavier tanks but it was noted that in this case it was important to hit only the most vulnerable areas of the tank. It is in fact a heavier version of the RPG40 containing substantially more explosive. It appears that it was used mostly if not wholey on the North Western (Leningrad) Front in WWII. Stocks captured by the Germans were designated as "Handgranate 338(r).

The grenade construction is the same as the RPG-40 differing only in dimension and weight. Function and use are identical.

VKG-40

Vintovochnaya Kumulyativnaya Granata 1940 (VKG-40)

The VKG-40 was introduced in about 1940 for use with a modernized cup discharger mounted on the Mosin Nagant rifle. There is little documented evidence of its use so it must be assumed it did not see widespread use. Its lack of use and quick replacement were partially due to it being quite inaccurate and also the need of the special launcher. It was replaced in early 1942 by the VPGS-41 that could be fired from any rifle without modification.

The grenade is very streamlined and has three raised ribs on the body that fit into grooves in the discharger cup. The effect of the ribs was to give a spin to the grenade stabilizing it in flight. The body contains a shaped charge to provide the anti tank capability. The igniter mechanism is located under a screw cap on the base of the grenade. The main body was painted olive green with the ogive painted black. The grenade is launched by a special launching cartridge containing 2.75 grams of powder.

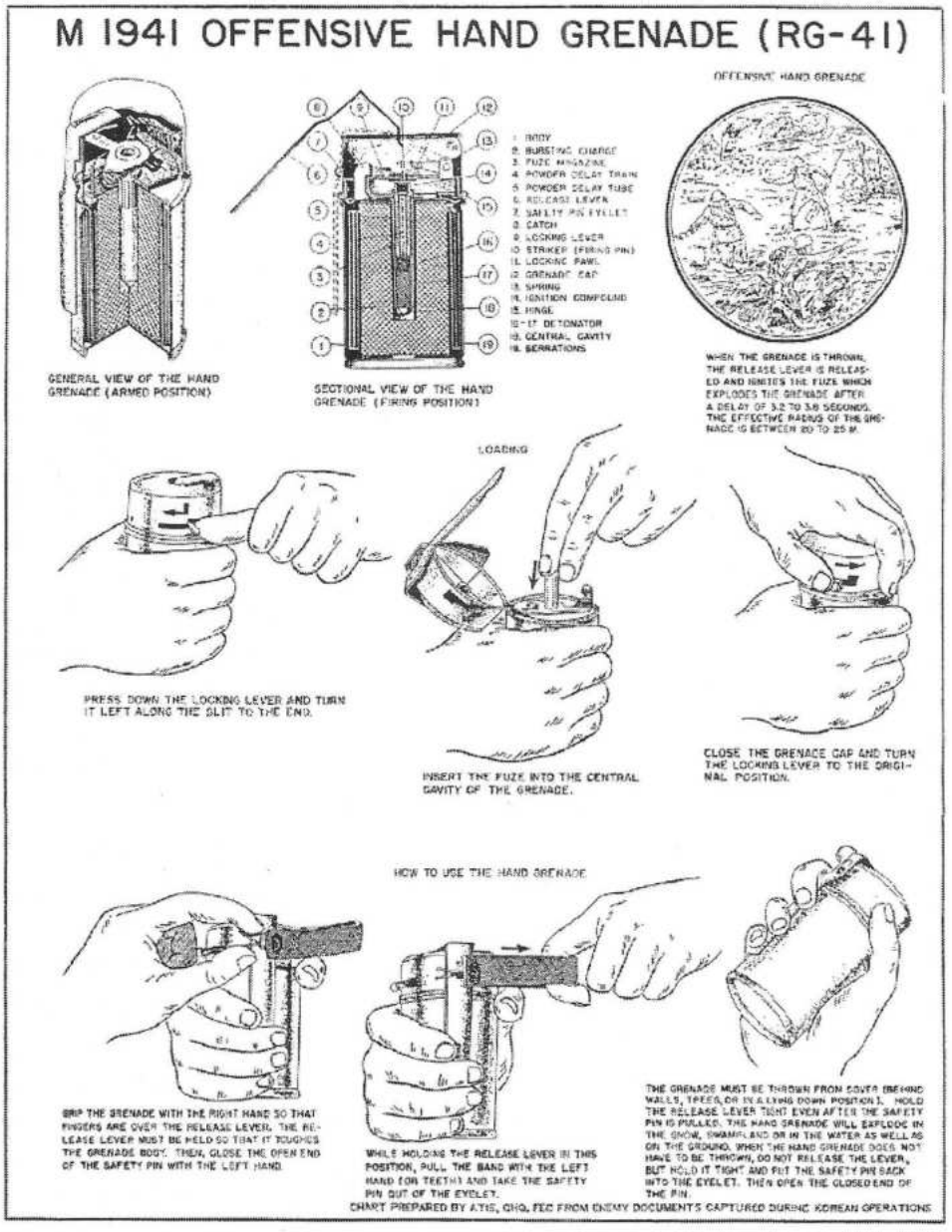
Ruchnaya Granata 41 (RG-41)

This grenade designed in late 1940 by N. P, Belyakow, after the Russian-Finnish war. It was adopted for use in January or February of 1941. It did not remain in service for long being quickly replaced by the RG42. Because of the light fragments produced it was used in both the offensive and defensive roles.

It relies heavily on sheet metal stampings for its construction. In fact the body of the grenade is little more that a tin can. The body contains three concentric liners of sheet metal to provide some light fragmentation effects. A detonator well is mounted in the centre of the top. A locking lug is also mounted to the top, opposite the hinge. Another tin can forming a cover is attached to the top of the grenade body by the hinge. The cover contains the igniter mechanism and covers the detonator well. A small locking lever is fitted to the cover to lock the cover in place when it is closed. A spring loaded striker is mounted inside the cover. The safety lever fits through a hole in the top of the cover and holds the striker in the cocked position. The safety lever is bent to conform to the shape of the grenade and has a hole in the lever to fit over a lug formed on the side of the cover. The lever is held in the safe position by a safety pin fitting through the lug. The safety pin is attached to a fabric pull loop.

Ruchnaya Granata 41

TYPE- Fragmentation
WEIGHT- 397-440 gm
DIAMETER- 53 mm
LENGTH- 105 mm
FILLING- 105 gm TNT
FUZE DELAY- 3.2-3.8 sec.



American training poster showing use of the RG 41

For use the grenade must first be primed. To prime the grenade the locking lever must be pressed down and moved left to the end of its slot. The cover can then be raised and the fuze inserted in the detonator well. Close the cover and return the locking lever to the original position. When ready to throw, hold the safety lever against the body and pull the safety pin. When the grenade is thrown, the striker, under pressure from its spring rotates downward throwing the safety lever off in the process. The striker hits the percussion cap in the end of the fuze which ignites the delay train. The delay burns down and initiates the detonator which explodes and causes the detonation of the main filler.

Vintovochnaya Protivotankovaya Granata Serdukov 1941 (VPGS-41)

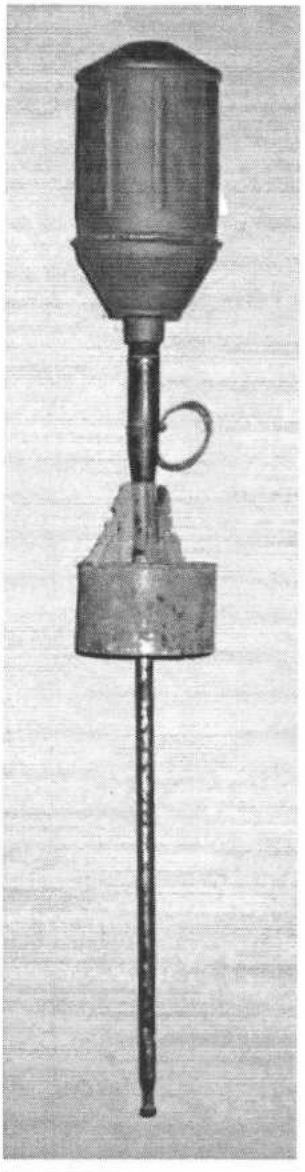
This was likely the last rodded grenade adopted by any army in the world. Development began in 1940 it was officially adopted in 1941. It is the second Russian grenade to use the shaped charge principle to defeat armour. Captured stocks we designated by the Germans as Gewehr-Panzergranate 172(r). It did not remain in service for long, as it was virtually ineffective against the German armour penetrating only 30 mm of armour at an angle of 30 degrees. In 1943 remaining stocks were modified to accept the UZRG fuze mechanism and used as hand grenades.

The body of the grenade is sheet metal formed into a cylinder. There are strengthening ribs formed into the sides of the body. The head is slightly cone shaped and is seamed and rolled onto the bottom after a sheet metal shaped charge liner is fitted. The shaped charge liner is hemispherical which is not the most effective shape likely contributing to the grenades poor penetration. A cone shaped cover with an adapter at its apex closes the base of the body. The igniter consists of a housing, weighted striker, creep spring, and safety pin. The housing is threaded on the top end to match the threading in the adapter. The base of the housing has a socket for the

VPGS-41

TYPE- Anti Tank
WEIGHT- 680 gm
DIAMETER- 60-61 mm
LENGTH- Total 455 mm
Warhead 115 mm
FILLING- 334 gm TNT or Melinite
IGNITER- Impact
PENETRATION- 30mm armour plate
RANGE 50 – 75 metres

launching rod and fin assembly to screw into. The weighted striker is fitted into the housing all the way to the base and is held in position by the safety pin fitting through holes in the housing and a matching hole through the striker. The creep spring is then placed on top of the striker. A detonator assembly is fitted into the head of the grenade through the adapter. The assembly consists of the detonator and a primer. The launching rod screws into the igniter mechanism housing and has a set of sheet metal fins fitted that can move on the rod. A section turned into the very bottom of the rod acts as part of a catch assembly which prevents the fins from sliding completely off. The fin assembly is constructed so that the tube that fits over the rod also forms part of the catch. The grenade is normally painted a light green.



VPGS 41
Photo- Alex Diehl

The steel rod caused barrel wear in the rifles it was fired from; in 1941 the rod was shortened slightly in an attempt to reduce the damage to the rifles.

Several versions of the grenade have been noted which visually may not be immediately apparent. Most of the modifications were fairly minor, not effecting its use so the original designation was retained.

VPGS 40- Probably a development version, this one has a conical base without a shaped charge.

VPGS 41- This version has a conical base with the shaped charge having a small cavity but does not have a shaped charge liner.

VPGS 41- This version has a flat base with the shaped charge having a small cavity without liner. There has also been a fragmentation liner placed in the body giving this version a dual purpose of anti tank/anti personnel.

VPGS 41- This version has a flat base with a shaped charge and liner. It retains the fragmentation liner. This version also has a dual purpose, anti tank/anti personnel.

For use, the fins are pushed as far up the rod as possible. The rod is then fitted into the barrel of the rifle all the way and the rifle loaded with a special launching cartridge. When ready to fire, the safety pin is removed freeing the striker. The creep spring is strong enough to hold the striker off the primer at this point. When the grenade is fired, the cartridge pushes the rod out of the barrel. As the rod is pushed up the barrel setback causes the fin assembly to move back on the rod until the catch engages the groove on the launching rod. The fin assembly stabilizes the grenade in flight and ensures it strikes the target headfirst. When the grenade strikes the target, the weighted striker overcomes the resistance of the creep spring and hits the primer. The primer fires causing the detonator to explode which in turn causes the main filling to detonate.

VPGS 41 Variant (Designation Unknown)

In 1943 any stocks remaining of the flat based VPGS 41 were converted to hand grenades. The grenade makes use of the body with the head becoming the bottom of the hand grenade. A UZRG fuze mechanism is used

VPGS 41 Variant

Mortar Shell Grenade

TYPE- Fragmentation
WEIGHT- 675 gm
DIAMETER- 52 mm
FUZE DELAY- 3.5 – 4.5 sec.
FILLING- TNT

instead of the impact igniter. The shaped charge liner remains in the body. The effects of the grenade would be similar to the RG42 but would also retain some of the effects of the shaped charge. If the grenade landed in a good position it would retain a limited armour piercing capability.

Improvised Mortar Shell Grenade (Designation Unknown)

This is improvised from a 52 mm HE Mortar shell, something the Russians likely learned from the Finns earlier in the war. They were mainly, if not wholly, used in the Leningrad area. Stocks captured by the Germans were designated as "Eihandgranate 307 (r)".

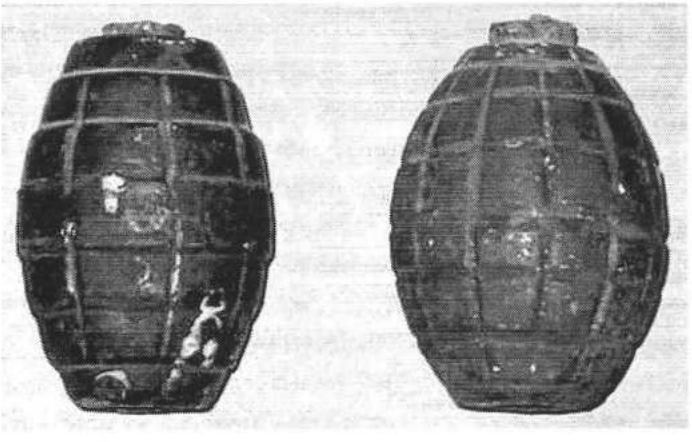
Mortar Grenade
Photo- Paul Spence

The body of the grenade consists of the main iron body of a 52 mm mortar shell. A specially designed adapter bushing is screwed into the nose of the shell. The adapter is threaded on the outside to match the threading in the body. There is a central bore through the adapter that is threaded to accept a standard Koveshikov fuze mechanism. There are also examples that have been found fitted with the UZRG fuze mechanism. The body is filled with an explosive charge of TNT. The body is typically painted a greyish brown colour.

The grenade operates in the same manner as the F1 and has virtually the same effects. For use, the safety pin is pulled, the mechanism is held safe by the cap and lever assembly. When the grenade is thrown, the cap, under pressure of the cap spring is thrown off axially. When the cap clears the retaining ball, the striker under pressure of the striker spring forces the retaining ball out of the mechanism and continues down until it strikes the percussion cap. The percussion cap fires, igniting the delay element. The delay element burns for 3.5 – 4.5 seconds before reaching the detonator and causing it to explode which in turn fires the main TNT filling.

Ceramic grenade (Designation Unknown)

During the Second World War the Russians introduced a ceramic grenade similar to the F1. It is unknown how long these were used or how many were produced, but they have been found on the former battlefields.



Ceramic Grenade Bodies
Photo- Alex Diehl

There are a number of variations in body style

indicating the grenades were made in several locations rather than a single manufacturer. The body is made of ceramic and is segmented on the outside. The segmentation would have no effect on the way the body shatters upon detonation and was likely designed simply to give a better gripping surface to the grenade. The body was cast with a fairly small explosive cavity in the centre of the body. A threaded metal adapter was cast into the top to accept the fuze mechanism. Examples have been noted with both the Kovesnikov and UZRG fuze mechanism. The body is painted dark brown, no other markings have been noted.

Ceramic grenade

TYPE- Fragmentation
HEIGHT- Body- 85 mm
DIAMETER- 60 mm
FILLING- TNT
IGNITER- Koveshikov or UZRG

Ruchnaya Granata 42 (RG 42)

The RG42 is a development by S.G. Korshunov of the RG41 using a standard UZRG fuze mechanism. It was adopted in 1942 and remained on inventory for many years. It was designed for use both as an offensive and defensive grenade. The RG42 has been found in use by many countries from Europe, Africa, the Middle East, and Southeast Asia.

RG 42

The body is in the form of a tin can with a bottom seamed on. A steel belt wound in three or four layers, is inserted into the body against the outer walls. The steel belt is preengraved in small squares to aid in its breakup. The explosive charge is placed into the body and an inner top with fuze well placed on top. The top is formed of the top cap with a threaded flange welded to the centre. A fuze well is attached below the flange and runs into the centre of the grenade body. The top is then seamed onto the body to complete the grenade. The flange is internally threaded to accept the UZRG, and later the UZRGM fuze mechanism. There are a number of variations on the flange attachment, noted are three small tabs, a single triangular shaped tab apparently riveted on, a single rectangular tab with rounded ends, a larger triangular tab with the ends rounded off and even one with an oddly shaped tab with no real shape. These variations are most likely due to manufacture in different factories.

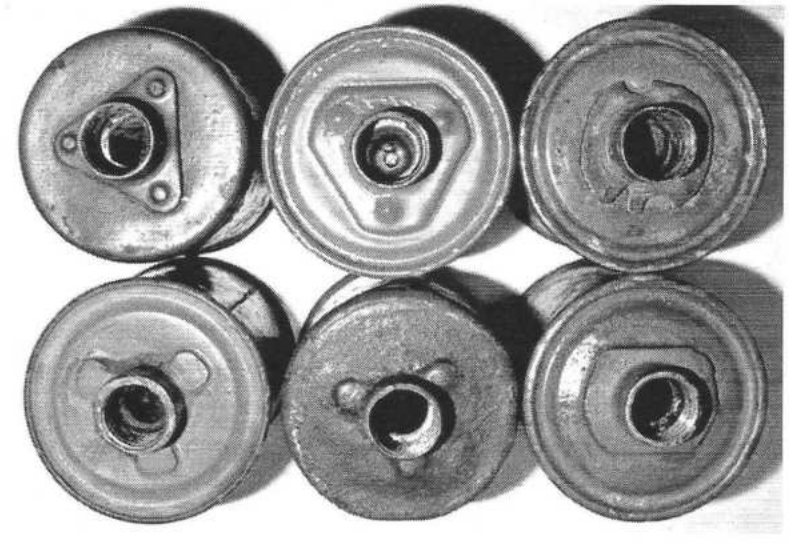


Photo showing various flanges on the adapters of the RG 42
Not all are Russian manufacture
Photo- Miloslav Gona

The grenade is issued separately from the fuze mechanisms. Initially it was issued with a wooden plug inserted into the detonator well or a metal cap over the top flange. Later issues had either a plastic plug or metal cap.

RG-42

TYPE- Fragmentation
WEIGHT- 435 gm
DIAMETER- 55 mm
LENGTH- with igniter 130 mm
without igniter 85 mm
FILLING- 110 gm TNT
IGNITER- UZRG or UZRGM
FUZE DELAY- 3.2 - 4.2 sec.

There was a fragmentation sleeve available for this grenade. Basically it was a heavier gauge steel sleeve that fit over the body of the grenade. The outside was scored in a diamond pattern.

Prior to combat the grenade must be primed by removing the plug or cap, and screwing in either a UZRG or UZRGM fuze mechanism.

For use the safety pin is pulled and the grenade thrown at the target, the striker, under pressure of the striker spring is forced down throwing the safety lever off in the process. The striker guided by the guide washer hits the percussion cap, which then fires and ignites the delay element. The delay element burns down for a delay of 3.2 - 4 seconds before reaching and initiating the detonator. The detonator fires and initiates the main charge of the grenade. The steel belt in the grenade produces a limited fragmentation effect.

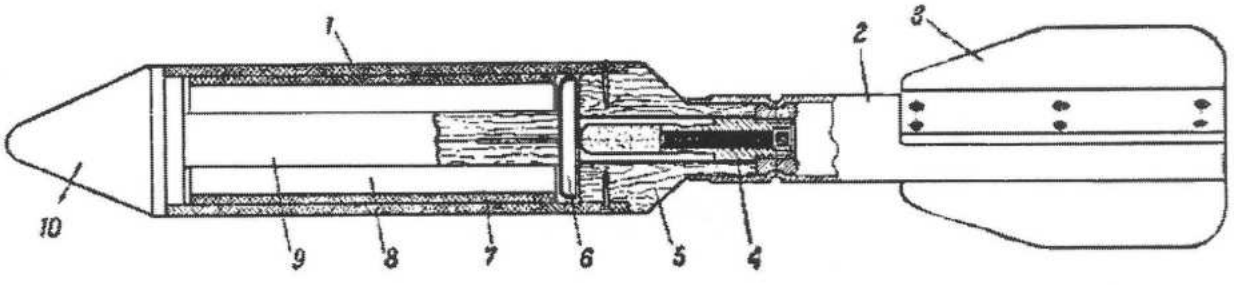
The grenade is normally painted olive green with markings in black however it may be found with other paint schemes ranging from light green to dark brown.

VAG-42

This grenade is designed to deliver propaganda leaflets to the enemy. It is fired from a specially designed spigot launcher attached to the Model 1891/30 rifle using a special launching cartridge supplied with each grenade.

The grenade is mainly constructed of wood and sheet metal. The main body is a sheet metal cylinder that is attached to a wooden base by wood screws. The wooden base is turned so that the larger end fits into the main body cylinder and the smaller end fits into the stabilizer tube. The base has a hole drilled completely through the centre. The stabilizer tube is a sheet metal cylinder that has two sets of fins attached to the bottom end by six rivets each. The two sets of fins are attached directly opposite to each other forming four fins. There is a steel washer attached into the top end of the stabilizer tube by pressing a groove in the tube into a corresponding groove in the washer. This forms the holder for the expelling charge assembly. The expelling charge assembly consists of a holder, primer, delay element and small charge container. A wooden spindle with a cone shaped end fits into the top end of the body. The spindle has a split cardboard cylinder around it forming the leaflet container. The cone shaped end forms the top end of the grenade and closes the body.

When the grenade is to be fired, remove the launching cartridge from the stabilizer tube where it is stored. Fit the grenade onto the spigot launcher and load the rifle with the cartridge. Aim in the direction of the target



VAG-42
1- Main body 2- Stabilizer tube 3- Fins 4- Expelling charge assembly 5- Wooden base 6- Spindle base
7- Cardboard cylinder 8- Leaflets 9- Spindle 10- Cone shaped cap

holding the rifle at a 40 to 45 degree angle. When the rifle is fired the gases formed by the propellant force the grenade off the spigot launcher. At the same time, the flash from the exploding propellant ignites the primer in the expelling charge assembly. The primer ignites the delay element which burns as the grenade travels through the air. After a delay of 5.5-6 seconds the delay element ignites the detonator. The explosion of the detonator forces the spindle out of the body. The split cardboard cylinder comes apart and the leaflets contained within are free to spread over a small area delivering propaganda messages to the enemy troops.

VKG-42

TYPE- Rifle, Anti Tank
WEIGHT- 800-900 gm
DIAMETER- 62 mm
LENGTH- 290 mm
FILLING- 300-400 gm

VKG-42

VKG-42

This is a spigot launched anti tank grenade adopted in 1942. There is little documented evidence of use, so it is assumed it was not used in great numbers. It is fired from a specially designed spigot launcher attached to the Model 1891/30 rifle using a special launching cartridge supplied with each grenade.

The grenade is mainly constructed of sheet metal. The main body is a sheet metal cylinder seamed on one side, with a cone shaped base and hemispherical top. The base is seamed onto the bottom of the body. A shaped charge liner fits into the top and is covered by the top which also acts as a standoff. The body contains the main explosive charge and a detonator assembly centrally located in the bottom. The detonator assembly consists of a primer, small detonator and booster. The stabilizer tube is a sheet metal cylinder that has two sets of fins attached to the bottom end. An impact igniter mechanism is attached to the top of the tube by pressing two grooves in the tube into corresponding grooves in the mechanism. The igniter consists of a housing, weighted striker, creep spring, and safety pin. The safety pin fits through the sides of the igniter mechanism and through the striker immobilizing it. The igniter mechanism and stabilizer tube assembly are held onto the main body by rivets.

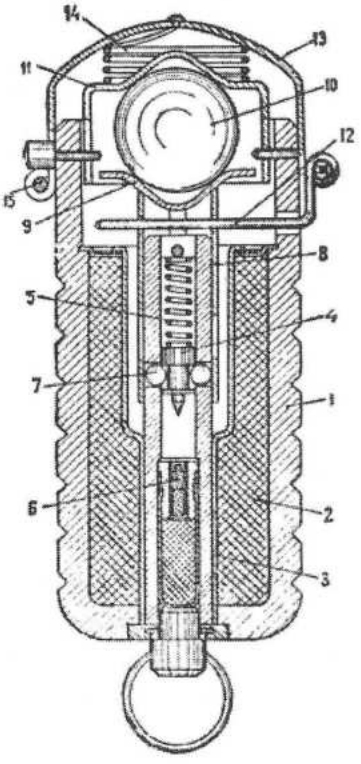
When the grenade is to be fired, remove the launching cartridge from the stabilizer tube where it is stored. Fit the grenade onto the spigot launcher and load the rifle with the cartridge. When ready to fire, remove the safety pin, take final aim, and fire the rifle. When the rifle is fired the gases formed by the propellant force the grenade off the spigot launcher. The stabilizer tube and fins ensure the grenade flies headfirst. When the grenade impacts the target, the weighted striker moves forward, overcomes the resistance of the creep spring, and strikes the primer. The primer ignites and fires the detonator. When the detonator explodes it fires the booster which fires the main explosive charge.

RGU

The RGU grenade is an impact grenade designed for use by tank crews. Designed for close in protection of the

tank, it could be tossed out of hatches or ports in the tank to defend against infantry too close to the tank for the normal armament to reach.

The main body is cast iron and is grooved on the outside to aid in fragmentation. Contained within the body are the explosive bursting charge and a central housing containing the impact igniter. The bottom of the body has a removable plug to allow priming of the grenade. The top of the body has a sheet metal cap that is part of and covers the impact ignition system. A spring is attached to the top cap. When the cap is closed on the body the spring is compressed against the upper cup. A ball shaped weight is held in place on top of the striker housing by the upper cup. The striker and its spring are contained within the central housing. The striker is held in the cocked position by two retaining balls that fit into a groove in the striker head and two holes in the central housing. The lower cup has an open-ended tube attached to the bottom that fits over the central housing far enough to hold the retaining balls in position. There are two escape holes in the tube that allow the balls to escape when the tube moves down. The detonator assembly consists of a small detonator and percussion cap.



RGU

1- Cast Iron Body
2- Explosive filling
3- Central Housing
4- Striker
5- Striker Spring
6- Detonator Assembly
7- Retaining Balls
8- Striker Housing
9- Lower Cup
10- Weight
11- Upper Cup
12- Safety Bar
13- Top Cap
14- Spring
15- Safety Pin

The grenade must be primed before use. To prime the grenade, remove the plug in the bottom of the grenade and insert the detonator assembly with the percussion cap end first. Once the detonator assembly is in place, replace the plug and lock it into position by turning it until locked.

When the safety pin is removed, the top cap must be held down by the fingers of the throwing hand to keep the grenade safe. When the grenade is thrown, the spring in the cap, forces the cap to rotate on its axis pin. Air resistance caused by the cap moving through the air, causes the cap which is attached to the safety bar, to withdraw the safety bar releasing the striker housing. When the grenade hits something, the striker housing, under pressure from the weight, moves down in the central housing until holes in the side allow the retaining balls to escape and release the striker. The striker, under pressure of the striker spring is forced down onto the percussion cap. The percussion cap then fires into the detonator igniting it. When the detonator fires it causes the main filling of the grenade to detonate.

ROG-43

ROG -43

This is a little known grenade that was most likely adopted in 1943.

The cylindrical grenade body is made of sheet metal and contains several layers of fragmentation liner and the main explosive charge. A central tube runs from bottom to top. The bottom of the grenade has a shutter that closes the tube and retains the detonator assembly when fitted. A heavier fragmentation sleeve can also be fitted to the outside of the body that is also

retained by the shutter on the bottom. The top of the grenade has a smaller diameter tube attached that forms part of the igniter mechanism. The top of the igniter tube has a slot formed in it. The striker is made of a heavy gauge sheet metal shaped to have two guides on the sides with the striker itself in the centre. The guides have lips formed at the bottom that ride against the side of the igniter tube. A striker spring is located in the igniter tube with the top against the top of the tube and the bottom pressing against the lips on the guides of the striker. The top of the striker protrudes from the igniter tube through the slot. A safety lever is bent to fit closely against the body of the grenade with the top end fitting into the striker to hold it in the cocked position. A cap with a slot for the striker is fitted over the igniter tube and safety lever. A two pronged safety pin formed of sheet metal fits through the holes in the striker on top of the cap retaining it in position.

For use the grenade must be primed with a detonator set consisting of a percussion cap, delay element, and detonator. This is inserted through the bottom of the grenade into the centre tube and the shutter closed over it to retain it. When the grenade is to be thrown, the safety pin is removed and the cap pulled or dropped off. The safety lever holds the striker in the cocked position. When thrown, the striker spring reasserts itself, pushing down on the striker. The downward movement of the striker throws the safety lever off. Continued movement of the striker forces it into the percussion cap which ignites the delay element. The delay burns down to the detonator which fires and detonates the main filling.

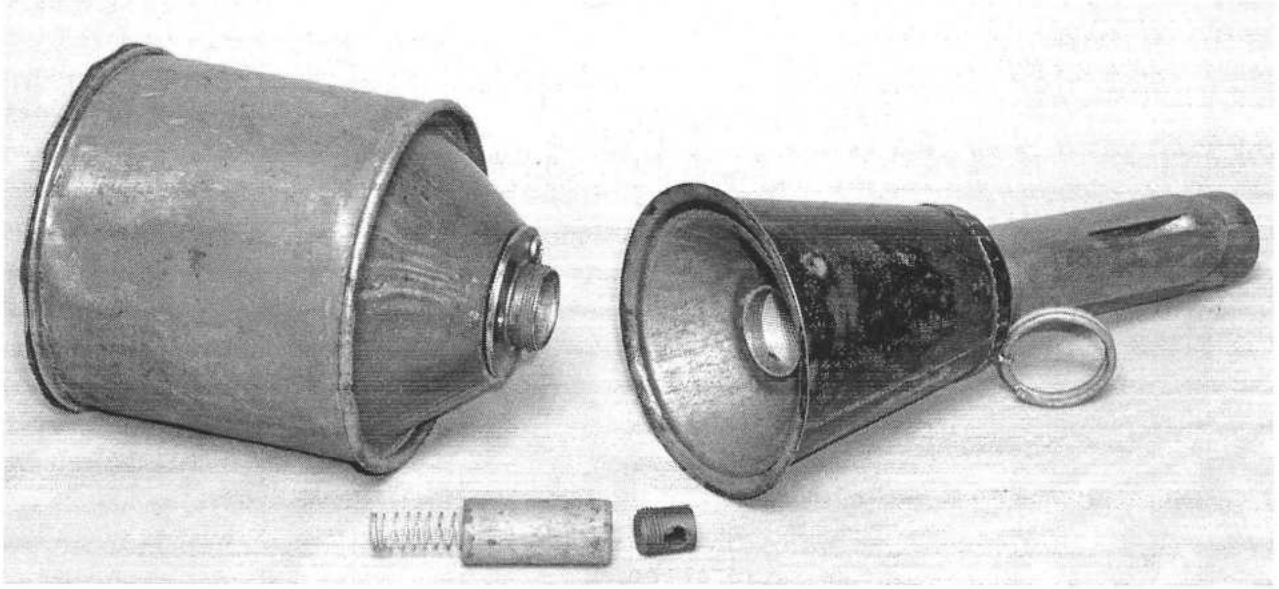
Ruchnaya Protivotankovaya Granata 1943 (RPG-43)

The RPG-43 was adopted for use in April 1943 to replace the RPG-40 as the primary anti tank grenade in the Russian arsenal. The RPG-40, being strictly a blast grenade, could not penetrate most of the German armour. To that end, the RPG43 was designed with a shaped charge that could penetrate up to 75mm of armour. The grenade also has a good fragmentation effect and can be used against personnel. This grenade can still be found in use in some countries but has been taken out of Russian service.

RPG-43

TYPE- Anti Tank
WEIGHT- 1200 gm
DIAMETER- 102 mm
LENGTH- Total 279 mm
Head 90 mm
FILLING- 640 gm TNT
IGNITER- Impact
EFFECTIVE RADIUS- 20 metres
PENETRATION- 75 mm

The main body consists of a cylindrical sheet metal container with a



RPG 43
Photo- Ed Strazdes

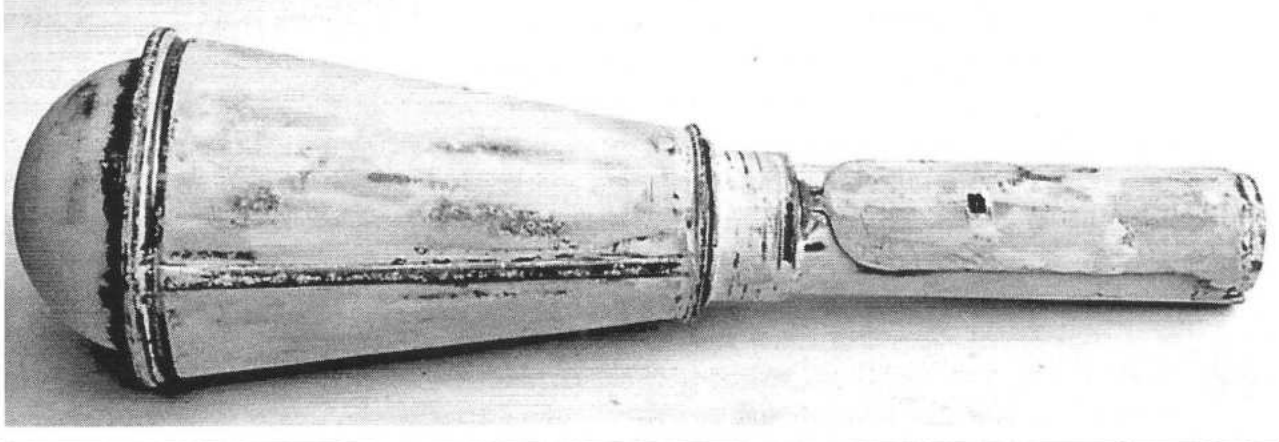
shaped charge liner mounted inside. The bottom of the body is cone shaped. The space below the liner is filled with TNT. A well in the centre of the cone has a striker mounted at the bottom. Screwed onto the well is a tube with a cone shaped cover attached just below the main body. A wooden handle is mounted on the end of the tube. A cone shaped sheet metal drogue fits over the handle and is attached to the tube by two cloth streamers. The drogue fits tightly against the cone shaped cover holding the cloth streamers in place. A sheet metal safety lever with a ridge on the top fits along the wooden handle holding the drogue in position and is kept in place by the safety pin. A spring located in the bottom of the drogue is compressed against a lip on the bottom of the tube. The detonator assembly consists of a detonator holder, detonator, and booster. This fits in the tube at the bottom of the body and is held in place by a drop out pin preventing any movement. There is also a creep spring between the striker and detonator assembly.

Typically the grenade is issued with an instruction label pasted to the head. The label would normally be in Cyrillic text but it is possible that Arabic text may be used depending on the country of use.

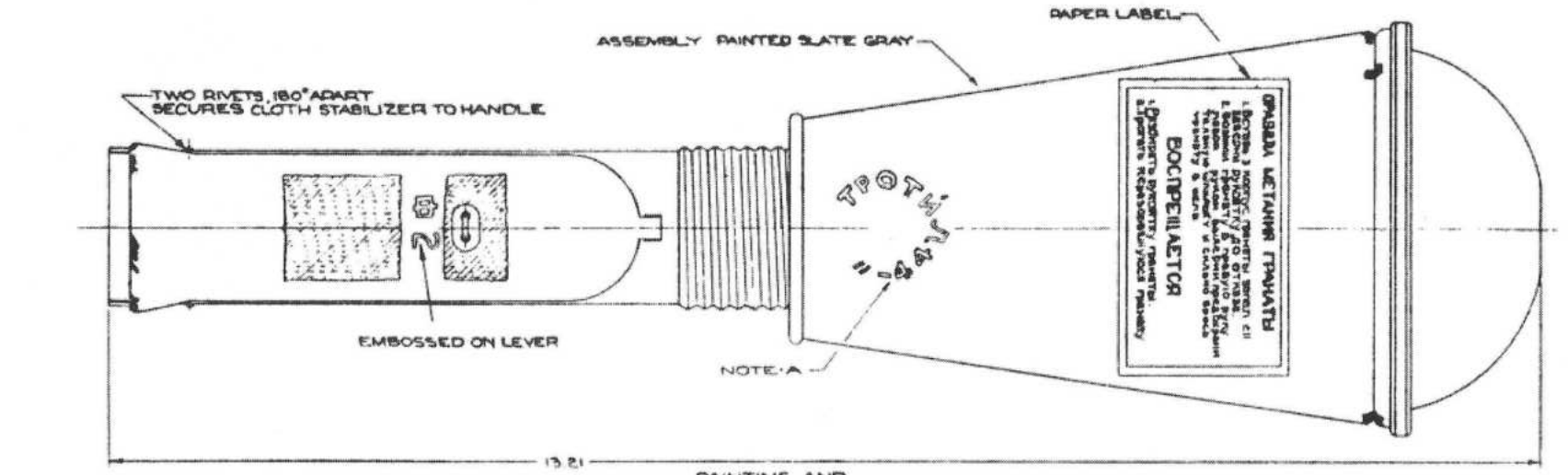
When the grenade is ready to be thrown, the safety pin is removed from the safety lever and the lever held tightly against the handle. When the grenade is thrown, the safety handle falls away and releases the drogue. The drogue is pushed off the bottom of the handle by the spring. The cloth streamers are pulled out by the drogue and the combination of streamers and drogue cause the grenade to fly head first. As the cloth streamers are pulled out, it releases the drop out pin which can then fall out releasing the detonator assembly. The detonator assembly is then held off the striker only by the creep spring. When the grenade hits the target, the detonator assembly is forced forward against the creep spring overcoming its resistance. The detonator hits the stationary striker and fires. The detonator causes the booster to fire which in turn causes the explosion of the main charge.

RPG 43
Photo- Bernt Bosman

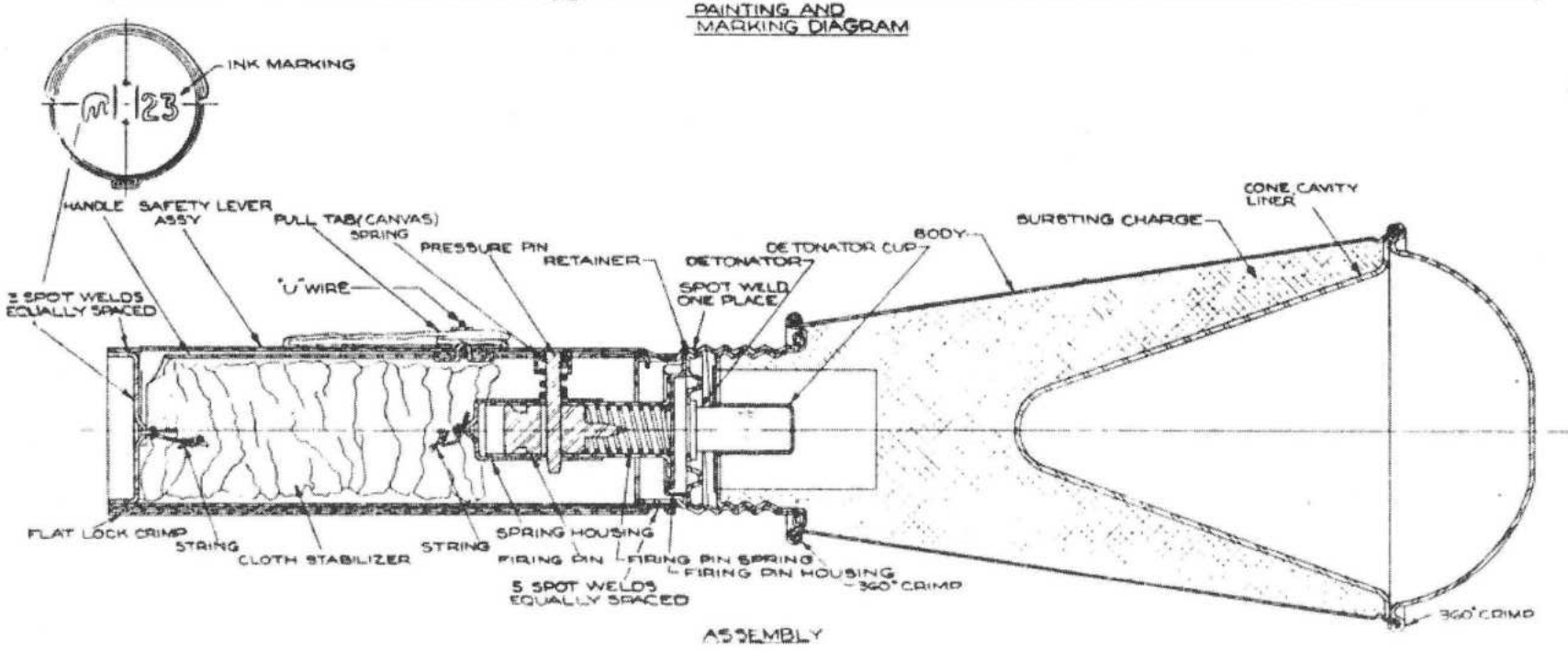
Ruchnaya Protivotankovaya Granata 6 (RPG-6)



RPG 6
Photo- Bernt Bosman



PAINTING AND MARKING DIAGRAM



ASSEMBLY

RPG 6

TYPE- Anti tank
WEIGHT- 1100 gm
LENGTH- 343 mm
DIAMETER- 102 mm maximum
IGNITER- Impact
FILLING- 562 gm TNT
PENETRATION- 100 mm
FRAGMENTATION RADIUS- 20 metres

The RPG-6 was adopted for use in October 1943. It continued in service with many of the Warsaw Pact countries for many years. Communist China and North Korea also adopted it and it was supplied to the North Vietnamese and Viet Cong during the various wars in that area. It was developed after the RPG-43 and improved on the armour penetration of that grenade. The RPG-6 could penetrate up to 100 mm of armour. It also had a pronounced fragmentation effect and could be used in an antipersonnel role.

The warhead is made of sheet steel in a conical shape. A steel shaped charge liner with and angle of 40 degrees 30 minutes fits into the top of the body which is then closed by a hemispherical sheet steel cap and crimped on. The cap ensures the grenade has sufficient stand off to allow the shaped charge to properly form before hitting the armour. A roll-threaded stem is crimped onto the bottom of the conical body. The space below the shaped charge liner is filled with TNT with a Tetryl booster at the very bottom. .A brass detonator cup is fitted into the bottom of the stem sealing the body.

The handle is hollow tube formed from sheet steel and contains the firing mechanism. The top end of the handle has a roll-threaded sheet metal nut spot welded on.

The firing mechanism consists of a firing pin housing, firing pin, creep spring, locking ball, ball housing, stabilizing strips, safety lever, retaining pin and retaining pin spring. The firing pin is held in the cocked position in the firing pin housing by the locking ball and the retaining pin that passes through the handle, ball housing, firing pin sleeve, and firing pin. The safety lever is mounted on the side of the handle that also forms the bottom of the handle and is held in place by a safety tab. The firing pin housing is spot welded into the bottom of the nut. The creep spring and firing pin are fitted into the housing and the locking ball fitting into a hole in the side of the housing and a groove in the firing pin. The ball housing fits over the end of the firing pin housing retaining the ball in position and locking the firing pin in position. The retaining pin and spring are then fitted through the side of the handle, through the ball housing, firing pin housing and finally the firing pin itself. The stabilzing strips are formed of 2 or possibly 4 strips of unmercerized cotton. The stabilizer is attached to the bottom of the handle on one end and to the safety lever on the other. A string leads from the centre of one strip to the bottom of the ball housing. The entire stabilizer is folded into the handle. The .A tab on the end of the safety lever fits into a hole in the handle and rotates down to form the bottom of the handle. A hole in the lever fits over a projection welded to the handle and allows the canvas pull tab and pin to retain the handle in position which holds the retaining pin and spring in place.

RGD 5
Photo- Bernt Bosman

When the safety tab is removed the safety lever is held in place by the hand. As the grenade is thrown, the handle under pressure from the retaining pin spring, is pushed away from the handle releasing the retaining pin. The retaining pin is pushed out of the handle by its spring releasing the positive safety. As the handle falls away it pulls the cloth streamers out of the bottom of the handle. When the cloth streamers deploy, the cord attached to the the ball housing pulls it off the bottom of the firing pin housing releasing the locking ball to fall out of position and release the firing pin. The striker is then held off the detonator only by the creep spring. The cloth streamers act as a drogue causing the grenade to travel head first. When the grenade strikes

the target, the weight of the striker overcomes the creep spring allowing the striker to hit the percussion cap in the detonator which fires and causes the detonation of the grenade.

RGD 5

TYPE- Fragmentation
WEIGHT- 310 gm
HEIGHT- 114 mm
DIAMETER- 57 mm
FILLING- 110 gm TNT
IGNITER- UZRGM
FUZE DELAY- 3.2-4.2 sec.
EFFECTIVE RADIUS- 15-20 metres

The grenade is normally painted a slate grey and has markings in black. In addition there is a paper instruction label attached to the head of the grenade. Located below the label is a marking giving the type of filling and date of filling. There are embossed markings on the safety handle and further painted markings on the bottom of the handle. The label gives instructions in Russian on the use of the grenade. Translated the label says "Instructions for throwing grenade: 1- Insert in the body of grenade a primer and screw in the handle tightly. 2- Take the grenade in the right hand and pull off with the left hand the safety pin, and throw the grenade with force towards the target. Forbidden: 1- To take apart the handle of the grenade. 2- To touch an unexploded grenade." It is possible that grenades issued to other countries have the instruction label in the appropriate language.

Ruchnaya Granata Dyakonova 5 (RGD-5)

This grenade was adopted by the Soviets in the early 1950's to replace the F1 and RG 42 grenades in service at the time. Over time it was also adopted by most nations of the Warsaw pact and was produced in various state arsenals. The grenade is known to have been produced in Russia (RGD-5), Poland (RGO), Bulgaria (RGD-5), East Germany (RGD-5) and China (Type 59). The grenade has been exported all over the world by several of the member countries.

The body is a two-piece sheet metal outer casing with a thin two piece presegmented fragmentation liner. The body is crimped together in the centre with a prominent seam. The top of the body has an internally threaded plastic liner for the igniter mechanism inserted through a hole in the top. Earlier manufactured grenades have a sheet metal liner. A crimped joint at the top of the grenade locks the liner in place in the upper half of the body. There are a number of "dimples" in the body, located just above and below the centre joint. The purpose of the dimples appears to be to retain the fragmentation liners in place while the grenade is being crimped together. A UZRGM igniter screws into the top of the grenade. The grenade is normally painted olive green with markings in black.

The grenade is normally issued unprimed with the fuze well sealed by a plastic plug.

URG-N
Photo- Ed Strazdes

URG-N

TYPE- Practice
WEIGHT- 600 gm
HEIGHT- Total 130 mm
Body- 87 mm
DIAMETER- 55mm maximum
51 mm main portion
FILLING- practice charge
IGNITER- UZRGM practice
FUZE DELAY- 3.2- 4.2 sec.

Uchebnaya Ruchnaya Granata Nastupatelnaya (URG-N)

This is the practice version of the RGD-5 grenade. It is used to provide training and practice in the methods of throwing hand grenades. Its weight and shape are similar to the live grenade. Early versions may have used RDG-5 bodies without filling and with a hole in the bottom. Later versions are as follows.

The body is a one piece solid casting in aluminum in the same basic shape as the RGD -5. A hole runs completely through the body from top to bottom. The top is threaded to accept the same practice fuze as used in the URG practice grenade.

The practice fuze is made in the same basic manner as a UZRGM fuze mechanism. The striker mechanism is the same but has a longer striker. Where the detonator would normally screw into the bottom the practice fuze has an adapter bushing. The adapter bushing is externally threaded at one end to screw into the striker mechanism. The other end is internally threaded to accept the practice charge. Two holes are drilled through the adapter to allow gas escape. The practice charge has a percussion cap mounted in the top end, which is threaded to screw into the adapter bushing. A time delay fuze runs through the body down to a smoke charge at the bottom end.

The body, striker mechanism, and adapter bushing are all reusable. The striker itself is normally replaced. To reload the grenade, unscrew the expended practice charge. The adapter bushing is then removed taking care to retain the spring and washer. Using a special drift, which is supplied on a ratio of one to every four grenades, insert the new striker in the end of the drift. Put the washer and spring onto the striker and insert the entire assembly into the housing. Push up until the head of the striker passes through the guide washer. Replace the safety lever and pin. Screw the adapter bushing back into the bottom and put a new practice charge in place. Then the assembled mechanism can be screwed back into the body.

The body is painted black with all markings in white. The markings are painted just above centre on the body and give the designation and what appears to be a lot number containing a manufacturing date. The practice fuze has the lower half of the safety lever and the ring on the safety pin painted purple to designate it as a practice mechanism.

Ruchnaya Kumulyativnaya Granata 3 (RKG-3)

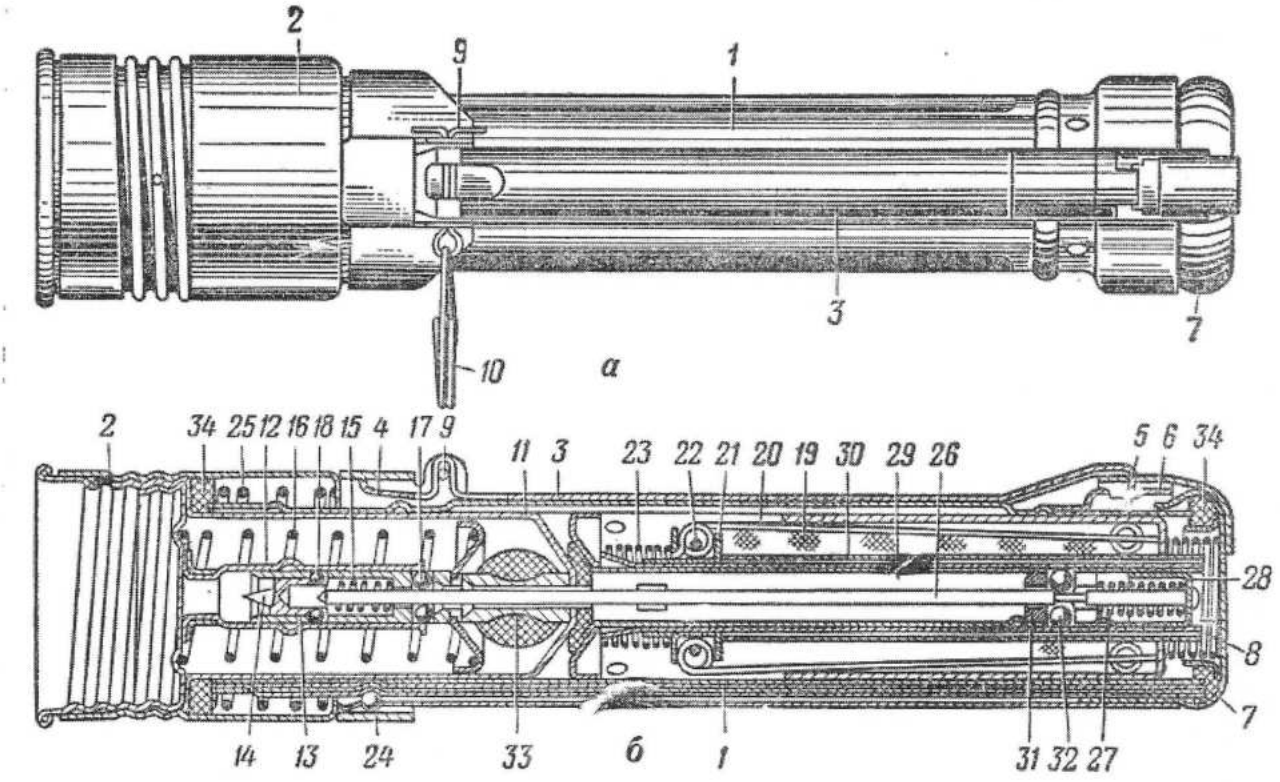
This is a post war designed anti tank grenade that replaced all previous anti tank grenades in Russian service. It has been exported all over the world.

The head is constructed of sheet metal in several parts. At the bottom is a simple cylinder with a closed end that provides the proper stand off for the shaped charge. The upper body contains the main explosive filling and has a shaped charge liner at the bottom. The top end has a well formed into the main filling. The bottom of the well has three cardboard gaskets topped by a supplementary charge. The bottom is closed by a cap that has a fuze well

RKG 3

TYPE- Anti tank
WEIGHT- 1070 gm
DIAMETER- 56 mm
LENGTH- 367 mm
FILLING- 567 gm RDX/TNT
IGNITER- Impact
FUZE DELAY- none
MAXIMUM PENETRATION- 125-180 mm

RKG 3
Photo- Bernt Bosman



RKG 3 Handle Diagram

1 Sheet metal body 2 Moveable sleeve 3 Safety handle 4 Sprung end of safety handle 5 Bent end of safety handle 6 Seal 7 Cap with strip 8 Cap Spring 9 Safety pin 10 Pull ring 11 Striker mechanism body 12 Pipette with flange 13 Striker body 14 Striker point 15 Operating Spring 16 Safety spring 17 Large Ball bearings 18 Small ball bearings 19 Stabilizer 20 Guy wire 21 Bushing 22 Ring 23 Stabilizer spring 24 Ball bearing 25 Moveable sleeve spring 26 Rod 27 Rod spring 28 Cap 29 Central tube 30 Moveable tube 31 Nipple 32 Ball bearings 33 Weight 34 Gasket

formed into the centre. The cap and top of the body are roll threaded to screw together. The top of the cap, where the fuze well is located is formed into a form of stud that is roll threaded to accept the handle. The handle assembly contains the firing mechanism and drogue assembly. The body of the handle has a socket at the bottom end threaded to fit the screw threads on the head. A safety handle runs along the side of the handle, held in position by the safety pin. The bottom of the handle is closed by a cap.

There are several versions RKG-3, RKG-3M, RKG-3T, RKG-3ZE, and RKG-3ZEM. The differences between the various versions may be slight and reliable information on the differences is difficult to come by. The RKG -3 has a steel shaped charge liner, the RKG-3M has a copper liner. The RKG-3T has yet another style liner but information on the difference is currently unavailable.

The grenade is painted olive green with markings in blank. The markings include the designation and throwing instructions.

Before use the grenade must be primed by unscrewing the handle, installing the fuze in the body and replacing the handle. When ready to throw, hold the grenade ensuring the safety lever is held securely. Remove the safety

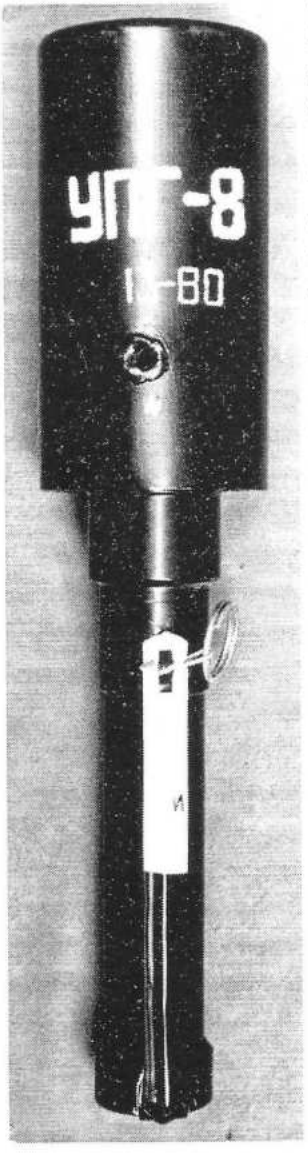
pin and throw the grenade. During the forward movement of he throwing arm the head and moveable sleeve move forward slightly compressing the spring in the moveable sleeve and releasing the sprung end of the safety lever. When the grenade leaves the hand the handle moves back into position under pressure of the spring. At the same time the cap is forced off the end of the handle under pressure of its spring withdrawing the strip and allowing the safety lever to fall away. The stabilizer is ejected by its spring and the guy wires force it open. As the air is trapped in the stabilizer it pulls on the moveable tube freeing the balls holding the rod. The rod spring withdraws the rod from the striker and releases the large balls. The grenade is now armed. When the grenade strikes the target the weight moves forward and compresses the double safety spring. At the same time the striker moves forward freeing the small ball bearings. The striker is then free to move forward and hit the primer which fires into the detonator. The detonator causes instantaneous detonation of the main charge.

Uchebnaya Protivotankovaya Granata 8 (UPG-8)

The UPG-8 is the practice version of the RKG-3 type anti tank grenade. It is used to practice troops in the use of the grenade and on exercises to simulate the explosion of the live version. They are normally issued in kits containing three grenades, spare drogue assemblies, and the tools used to reload the grenades. Spotting charges are issued separately.

UPG 8

TYPE- Practice
DIAMETER- 76mm
LENGTH- 368mm total
150 mm Warhead
FILLING- Practice charge
IGNITER- Impact
FUZE DELAY- none

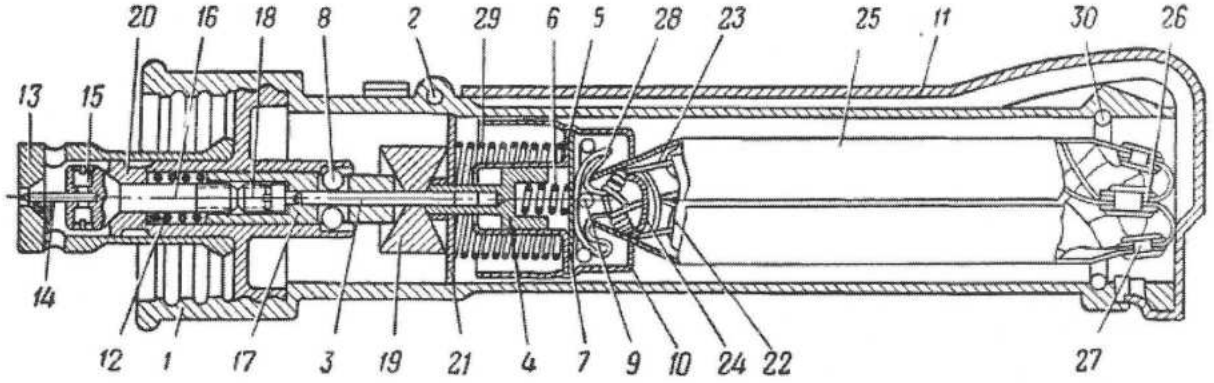


UPG 8
Photo- Bob Leiendecker

The head is constructed of steel. The main body is a cylinder with the top and bottom welded on. A smaller tube runs through the centre from top to bottom. The centre tube forms a chamber for the practice charge and at the bottom end has a roll threaded adapter to allow the handle to screw onto. Two smaller tubes run through the sides of the body into the chamber and are welded in position.

The handle contains the igniter mechanism. The handle body is a tube with a roll threaded socket on the top end to screw onto the head. Just below the socket is a lug for the safety pin. The bottom end is reinforced by a thicker portion. The handle is formed from a single piece of aluminum. About 1/3 the way down from the socket is a stop washer mounted permanently into the handle. Below the stop washer is a second safety mechanism consisting of a body, deployment spring, rod head, second safety spring and washer. This is retained in the handle by a stop ring fitted into a groove on the interior of the handle near the bottom end. The drogue parachute fits below that. The parachute assembly is formed of a four sided parachute, spring wire and stabilizer tray. The parachute is attached to the washer in the second safety body by a cloth tie from the spring wires. The two spring wires are attached to opposite corners of the parachute by rivets. Two cloth strips attached to the small end of the parachute are attached to sides of the stabilizer tray. When fitted into the handle the parachute and spring wires are folded into the stabilizer tray.

The actual firing mechanism screws into the top end of the handle and consists of housing, striker, striker body, spring, two balls, and a stop bushing. The housing has an enlarged section in the middle that is threaded to screw into the handle. The housing itself is countersunk at the top end and is bored to form a stop near the top end and a groove inside the lower end. A spring fits into the lower end followed by the striker body. The two balls fit into holes in the side of the striker body and are retained in position by the walls of the housing when assembled. The striker is fitted in through the top end and screwed into the striker body holding the entire mechanism



UPG 8 Handle Diagram

1 Body **2** Safety Pin **3** Rod **4** Rod Head **5** Bushing **6** Safety Spring **7** Washer **8** Ball Bearing **9** Loop **10** Second Safety Body **11** Safety handle **12** Safety Spring **13** Stop Bushing **14** Striker Point **15** Stop Screw **16** Striker Head **17** Striker Body **18** Counterscrew **19** Weight **20** Threaded Bushing **21** Stop Washer **22** Drogue **23** Guy Wire **24** Stabilizer Ring **25** Tray **26** Band **27** Band Crimp **28** Strap **29** Deployment Spring **30** Stop Ring

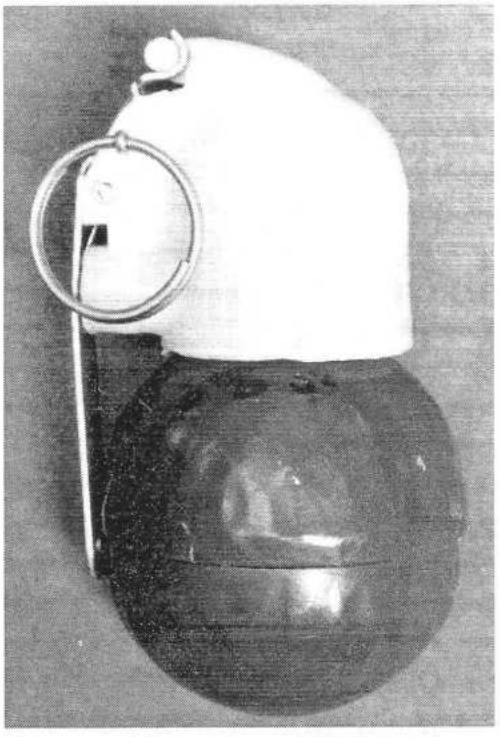
together. The stop bushing is then press fitted onto the top end. The entire mechanism then screws into the handle.

When the drogue is pushed into the handle, it forces the second safety mechanism up into the body, pushing the rod through the stop washer. The safety handle is then fitted over the bottom of the handle and pushed against it until the lug fits through a hole in the safety lever. The safety pin fits through the hole, holding the entire thing together. The inertial weight is placed in the top end and the firing mechanism is screwed down. The rod on the second safety mechanism is forced up into a hole through the striker body, pushing the balls into a small groove formed in the housing. The two balls prevent the striker from moving forward and protruding out through the stop bushing forming a positive safety.

The simulation or spotting charge resembles a large shotgun shell. It has a paper casing except for the base. A percussion cap is fitted into the base and the case filled with a smoke composition. The case is closed by three wads. The charge is fitted into the grenade by unscrewing the handle, placing the charge in its chamber in the head, and screwing the handle back on.

When the grenade is thrown, the safety lever is forced off by the action of the deployment spring forcing the second safety down and pushing the drogue out. As the drogue is pushed out, the spring wires force the stabilizer tray apart allowing the drogue to deploy. As the second safety is pushed back it pulls the rod out of the firing pin body releasing the balls and freeing the striker. The striker is then held back by the striker spring. The drag caused by the drogue forces the grenade to fly head first ensuring it will strike the target with the warhead forward. When the grenade strikes, the inertial weight pushes the striker forward overcoming the striker spring and allowing the striker to protrude through the stop bushing and strike the percussion cap in the spotting charge.

The grenade is painted black with markings in white. The head is marked in Cyrillic with the designation "UPG-8" and date of manufacture. One half of the safety lever is also painted white.



RGN
Photo- Bob Leiendecker

Ruchnaya Granata Nastupatel'naya (RGN)

This grenade was adopted by the Russian forces in the mid 1980's to replace the RGD-5. It is produced and in service with Russia and the Ukraine and is in service with a number of other countries.

The grenade body is made of aluminum. It is constructed of two single layer hemispheres that are internally segmented to increase the effectiveness of the fragments. The top of the body has a threaded adapter crimped in leading to a detonator well. The body is filled with 114 grams of A-1X-1 explosive (96 % RDX 4% wax).

The igniter mechanism has a dual ignition system. Once the safety lever is released, there is a 1 to 1.8 second arming delay after which the fuze will operate on impact. If after a delay of 3.5 to 4 seconds the grenade has not impacted or the impact was insufficient to cause the fuze to operate, the self destruct will operate and cause detonation. The grenade initially used the UDZ igniter mechanism, later changed to a modified version the UDZS. The particular differences between the two mechanisms is unknown.

RGN

TYPE- Offensive
WEIGHT- 310 gm
DIAMETER- 60 mm
LENGTH- 114 mm
FILLING- 114 gm A-1X-1
IGNITER- UDZ or UDZS Impact
FUZE DELAY- 3.5- 4 sec.
EFFECTIVE RADIUS- 10 metres

The mechanism is housed in a plastic body. A central well in the body contains the impact mechanism consisting of a striker, striker spring and weighted ball. Inclined surfaces on the inside of the housing and on the striker are designed so that if the ball moves in any direction it will force the striker down onto a primer. The safety lever is attached to the side of the mechanism. The safety lever holds the striker in the cocked position. A housing on the side, underneath the safety lever contains the primer. There are three delay elements located within the housing with the ignition ends facing a small chamber under the primer. One delay element is the self destruct delay, one is the arming delay and one is a shutter release. The shutter is located in the mechanism below the impact mechanism. The bottom of the mechanism is closed by a plastic plug that contains the detonator and is threaded to match the threading in the detonator well.

When the pin is pulled and the grenade thrown, the safety lever rotates up propelled by the striker and striker spring. As it is pushed out of the way it exposes the primer. The striker rotates downward and strikes the primer. The primer ignites and flashes into the small chamber. The flash of the primer ignites the three delay elements. When the combustible material in the shutter release burns away, it allows the shutter to rotate under spring pressure. When the combustible material in the arming delay burns away, it allows detents to withdraw under pressure of springs freeing the impact mechanism. When the grenade impacts the weighted ball moves against the inclined surface forcing the striker down onto a primer which fires and flashes into the detonator causing it to detonate and initiate the main filling. Should the impact mechanism not operate in 3.5 to 4 seconds, the self destruct delay burns down and initiates a small relay detonator which fires, causing the main detonator to fire and initiate the main filling.

The body is painted olive green with markings in black. The igniter mechanism is white. The outside of the body is smooth. The grenades are issued unprimed with the igniter mechanism and main body separated. The

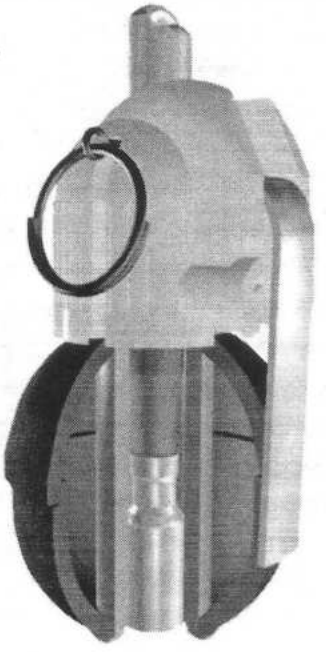
body is closed by a plastic plug until primed with the igniter mechanism.

PUI-RGN

PUI-RGN
TYPE- Practice WEIGHT- 310 gm DIAMETER- 60 mm FILLING- Sound and Flash charge IGNITER- UZRGM practice FUZE DELAY- 3.3- 4.3 sec.

This is a practice version of the RGN with a smooth lower half of the body.

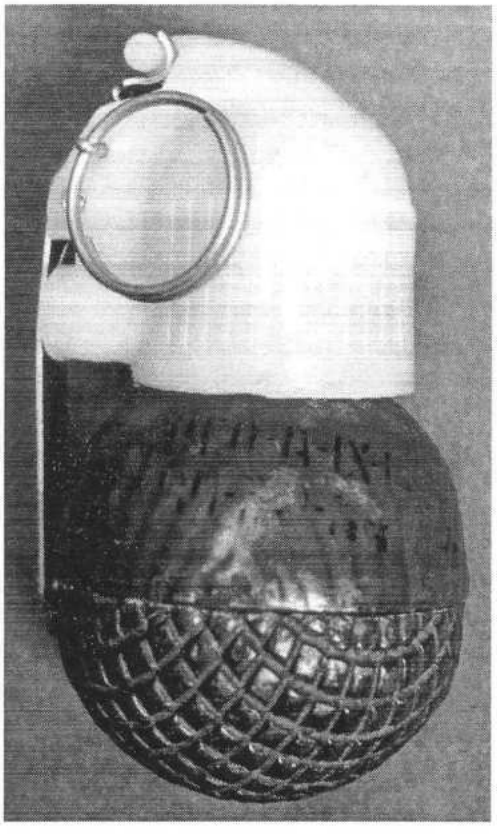
The body is identical to a live grenade but has a tube running completely through the body top to bottom. The fuze mechanism has been modified so that it continues to look like the live grenade but is fitted with a practice UZRGM mechanism. The safety lever of the UZRGM mechanism has been modified so that it fits over the plastic mechanism housing and is in the same position as a live grenade. The fuze mechanism is reloadable so the grenade may be used many times.
The practice grenade does not have the impact detonation of the live grenade but will fire after a delay of 3.3 to 4.3 seconds.



PUI-RGN

Ruchnaya Granata Oboronitel'naya (RGO)

This grenade was adopted by the Russian forces in the mid 1980's to replace the RGD-5. It is produced and in service with Russia and the Ukraine and is in service with a number of other countries.



RGO
Photo- Bob Leiendecker

The grenade body is made of aluminum. It is constructed of two double layer hemispheres. Both layers of the upper hemisphere are internally segmented; the lower hemisphere has the inner layer internally segmented and the outer layer externally segmented. The top of the body has a threaded adapter crimped in leading to a detonator well. The body is filled with 92 grams of A-1X-1 explosive (96 % RDX 4% wax).

The igniter mechanism has a dual ignition system. Once the safety lever is released, there is a 1to1.8 second arming delay after which the fuze will operate on impact. If after a delay of 3.5 to 4 seconds the grenade has not impacted or the impact was insufficient to cause the fuze to operate, the self destruct will operate and cause detonation. The grenade initially used the UDZ igniter mechanism, later changed to a modified version the UDZS. The particular differences between the two mechanisms is unknown.

RGO
TYPE- Defensive WEIGHT- 530 gm DIAMETER- 60 mm LENGTH- 114 mm FILLING- 92 gm A-1X-1 IGNITER- UDZ or UDZS Impact FUZE DELAY- 3.5- 4 sec. EFFECTIVE RADIUS- 6-20 metres

The mechanism is housed in a plastic body. A central well in the body contains the impact mechanism consisting of a striker, striker spring and weighted ball. Inclined

surfaces on the inside of the housing and on the striker are designed so that if the ball moves in any direction it will force the striker down onto a primer. The safety lever is attached to the side of the mechanism. The safety lever holds the striker in the cocked position. A housing on the side, underneath the safety lever contains the primer. There are three delay elements located within the housing with the ignition ends facing a small chamber under the primer. One delay element is the self destruct delay, one is the arming delay and one is a shutter release. The shutter is located in the mechanism below the impact mechanism. The bottom of the mechanism is closed by a plastic plug that contains the detonator and is threaded to match the threading in the detonator well.

When the pin is pulled and the grenade thrown, the safety lever rotates up propelled by the striker and striker spring. As it is pushed out of the way it exposes the primer. The striker rotates downward and strikes the primer. The primer ignites and flashes into the small chamber. The flash of the primer ignites the three delay elements. When the combustible material in the shutter release burns away, it allows the shutter to rotate under spring pressure. When the combustible material in the arming delay burns away, it allows detents to withdraw under pressure of springs freeing the impact mechanism. When the grenade impacts the weighted ball moves against the inclined surface forcing the striker down onto a primer which fires and flashes into the detonator causing it to detonate and initiate the main filling. Should the impact mechanism not operate in 3.5 to 4 seconds, the self destruct delay burns down and initiates a small relay detonator which fires, causing the main detonator to fire and initiate the main filling.

The body is painted olive green with markings in black. The igniter mechanism is white. The lower half of the body is segmented to provide easy identification between the RGO and RGN grenades.

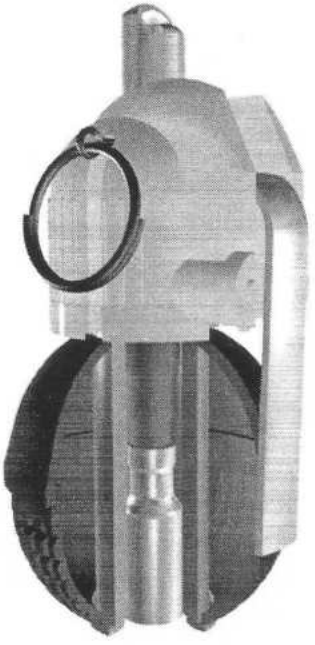
PUI-RGO

PUI-RGO
TYPE- Practice WEIGHT- 530 gm DIAMETER- 60 mm FILLING- Sound and Flash charge IGNITER- UZRGM practice FUZE DELAY- 3.3- 4.3 sec.

This is a Practice version of the RGO with the lower half of the body segmented to differentiate it from the PUI-RGN.

The body is identical to a live grenade but has a tube running completely through the body top to bottom. The fuze mechanism has been modified so that it continues to look like the live grenade but is fitted with a practice UZRGM mechanism. The safety lever of the UZRGM mechanism has been modified so that it fits over the plastic mechanism housing and is in the same position as a live grenade. The fuze mechanism is reloadable so the grenade may be used many times.

The practice grenade does not have the impact detonation of the live grenade but will fire after a delay of 3.3 to 4.3 seconds.



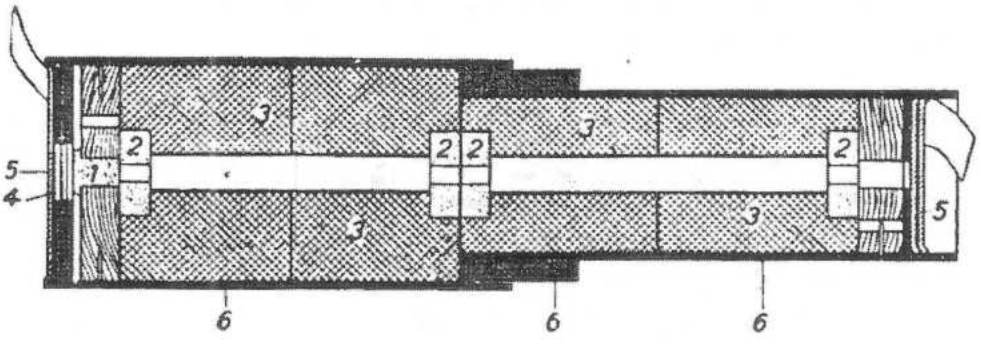
PUI-RGO

Ruchnaya Dimovaya Granata 1 (RDG-1)

This grenade was adopted for use in about 1948. The grenade is designed to float and may be used to produce a smoke screen over water.

The main body is made of grey molded cardboard and has a cardboard tube running through the centre of the grenade. There are ignition pellets at both ends and two in the middle. The ends of the grenade are closed by

wooden discs that are held in by small nails. There are holes in the discs corresponding to the cardboard tube and emission holes surrounding the central hole. The friction head is attached into the hole in the larger end of the grenade. Card board caps protect and seal the ends. Tapes protruding from under the caps provide a quick method of removal.



RDG-1
1 Igniter head 2 Ignition pellets 3 Smoke Compound 4 Friction Block
5 End caps 6 Body

The cap on the large end also holds and covers the friction block used to ignite the grenade. The friction block is attached to the removal tape to prevent its loss. A piece of paper between the igniter head and friction block keeps them separated until required for use.

RDG-1

TYPE- Smoke, Screening
WEIGHT- 500 gm
DIAMETER- Maximum 61mm
Minimum 44 mm
LENGTH- 222mm
FILLING- Napthalene/Black powder

For use, hold the grenade by the small end and remove the end cap then remove the cap on the large end and retain the friction block. Expose the igniter head and firmly scratch the friction block over it. Look to ensure the grenade has ignited and throw the grenade at the target. Once ignited the grenade emits smoke for a period of about 90 seconds which will cover an area of 30 square yards with an effective smoke screen.

Ruchnaya Dimovaya Granata 2 (RDG-2)

This grenade was adopted for service in the early 1950's and was subsequently adopted by all Warsaw Pact countries. It does not float unless ignited so once ignited it can produce a smoke screen over water. When ignited it reaches its maximum smoke production in less than 10 seconds and will produce smoke for 50 to 90 seconds.

The body is made of a waxed cardboard cylinder. The filling is an HC smoke composition. The bottom of the body is closed by a light coloured cardboard end cap with a tape protruding from underneath. The cap covers several emission holes in the end. The top end is closed by a dark coloured cap with a protruding tape. The tape is attached to a doughnut shaped striker board. A cardboard tube runs through the body from the bottom central hole about half way until it meets the igniter. The top end of the igniter has a match head ignition end covered by paper. The doughnut shaped striker fits over the match head, prevented from touching it by the paper. The top end of the grenade also has emission holes in the same manner as the bottom.

RDG-2

TYPE- Smoke, Screening
WEIGHT- 500 gm.
DIAMETER- 53 mm
LENGTH- 215 mm
FILLING- Smoke Compound
FUZE DELAY- 5-10 sec.

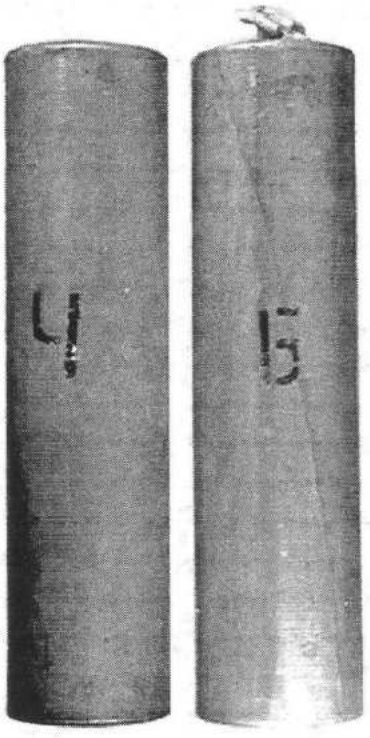
RDG-2Ch

TYPE- Smoke, Screening
WEIGHT- 500 gm.
DIAMETER- 53 mm
LENGTH- 215 mm
FILLING- Smoke Compound
FUZE DELAY- 5-10 sec.

RDG-2Kh

TYPE- Smoke, Screening
WEIGHT- 600 gm.
DIAMETER- 53 mm
LENGTH- 215 mm
FILLING- HC Smoke Compound
FUZE DELAY- 5-10 sec.

The grenade is a natural cardboard colour with the entire outside coated in lacquer. The bottom end has a light coloured cap, the ignition end a dark cap. The grenade is marked with a letter indicating the colour of smoke produced.



Right- RDG-2
Left- RDG-2Ch
Photo- Bob Leiendecker

For use, first pull on the tape protruding from the bottom of the grenade, this will pull off the end cap exposing the emission holes. Secondly, pull the tape on the top of the grenade and remove the cap. The tape is attached to the striker board and must be retained. Remove the protective paper covering the match head of the igniter. Using the striker, draw it across the match head and ensure it ignites. Throw the grenade. After a delay of about 10 seconds, smoke will begin to emit. When ignited, the grenade produces large volumes of white smoke that is emitted from both ends of the grenade. When ignited it reaches its maximum smoke production in less than 10 seconds and will produce smoke for 50 to 90 seconds.

Ruchnaya Dimovaya Granata 2Ch (RDG-2Ch)

This grenade is identical to the RDG-2 but produces Black smoke.

Ruchnaya Dimovaya Granata 2Kh (RDG-2Kh)

This grenade is identical to the RDG-2 but produces Grey smoke.

Grenade, Hand, Lacrymatory (Designation Unknown)

There is a version of the RDG-2 that is filled with a lacrymatory compound instead of smoke. These are identified by a blue band painted around the grenade.

Ruchnaya Dimovaya Granata 3 (RDG-3)

The RDG-3 Smoke grenade is identical in construction and use to the RDG-2 but produces orange smoke for use in signaling.

Ruchnaya Dimovaya Granata P (RDG-P)

This is a Russian Smoke grenade that has been in service since at least 1984, the actual date of adoption is unknown.

The casing is a cylindrical plastic tube with a closed bottom and metal reinforcing ring at the top. The top end has a plug inserted that forms the igniter housing and has a friction igniter attached in the centre. There are three elongated emission holes surrounding the igniter. The emission holes are sealed with metal foil under the plug. A pull string and ring are attached to the igniter. A rubber cap covers the entire top of the grenade retaining the pull string under it.

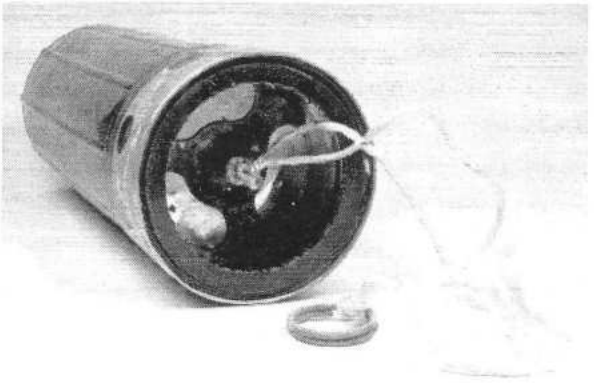
RDG-P

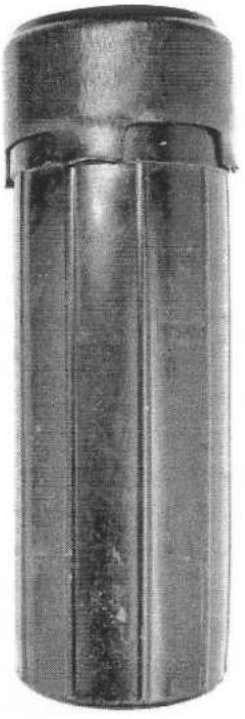
TYPE- Smoke/Screening
WEIGHT- 500 gm
DIAMETER- 55 mm
LENGTH- w/o cap 153 mm
DELAY- 3-5 sec.

The entire grenade is made of a dark brown or black plastic. Markings on the bottom give the designation, manufacturers number and date of manufacture.

For use, pull off the end cap and grasp the pull string. Give the string a sharp tug which will pull the friction wire out of the igniter and cause it to ignite the delay

element. Throw the grenade immediately. After a delay of 3 to 5 seconds the delay element will ignite the filling. The burning filling melts or bursts the sealing foil exposing the emission holes and allowing the smoke to escape. The grenade will emit smoke for a period of 60-120 seconds covering an area of about 35 square metres.





RDG-P
Photos- Alex Diehl

SV-1357

This is a modern bursting smoke grenade that is in use by Russian Special Operations units. It is unlikely that it is on issue to normal military forces. The grenade uses the UDZ/UDZS impact fuze mechanism. It is designed to produce an almost instantaneous smoke screen, either indoors or outdoors.

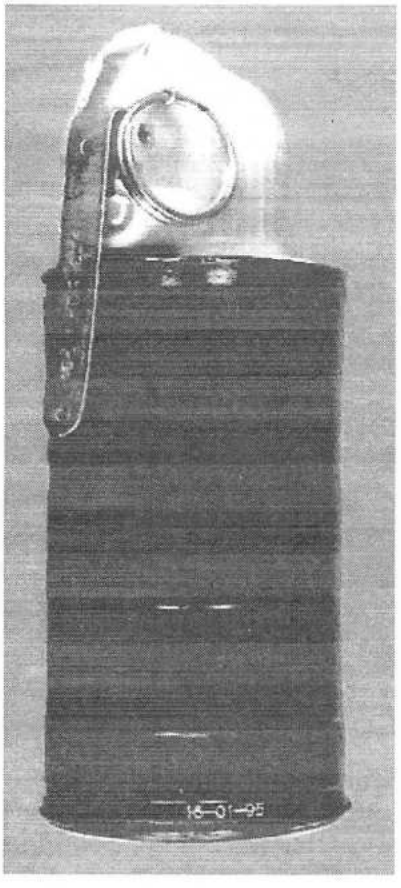
SV-1357

TYPE- Smoke
WEIGHT- 390 gm
LENGTH- 167 mm
DIAMETER- 67 mm Maximum
IGNITER- Impact
FILLING- Smoke compound

The main body is cylindrical. The body material is unknown at this point but is presumed to be made from non lethal components. The UDZ mechanism screws into the top of the body. The filling is a form of burning smoke compound that ignites instantly and will produce a smoke screen that may last up to 10 minutes depending on conditions.

The grenade operates the in the same manner as the RGO/RGN grenades. When the igniter fires, it bursts the body and ignites the filling at the same time. An effective smoke screen is formed in one second by the burning filling. The smoke produced is white and its obscuring power is such that someone in the smoke will have a vision limit of 1 metre. The smoke cloud will cover an area of up to 250 cubic metres. Given that the body bursts and the smoke compound burns, its use indoors would present a significant fire hazard.

The information and photo presented here comes from an information sheet produced by the Federal Security Service of the Russian Federation.



SV-1357

Bulgarian Grenades

For about five centuries the Ottoman Turks occupied Bulgaria. As a result of the Russo-Turkish War, in 1878 a portion of Bulgaria became an autonomous principality. Russia sent officers to assist in the formation of a new Bulgarian army. There were some experienced officers in the newly created Bulgarian Army that understood the effectiveness of "handbombs" and advocated their use. In 1885 during the Serbo-Bulgarian war at the defense of the Fortress of Vidin, the Bulgarians used handbombs made of dynamite cartridges and small cannon balls to good effect.

The beginning of hand grenade production in Bulgaria came in about 1895 but not as an official function. A revolutionary group (Vatreshna Makedono-Odrinska Revoliutsionna Organizatsia) devoted to the liberation of Macedonia and Odrin emerged in Bulgaria and was apparently sanctioned by Bulgarian authorities. The vice chairman, Naum Tjufekchiev (1864-1916) organized a workshop to manufacture hand grenades. The workshop produced about 300 cast iron bodies that were filled with a mixture of 84% Potassium Chlorate and 16% Sugar. The fuze consisted simply of a nail and small glass vial filled with concentrated sulphuric acid. Just prior to throwing, the nail was used to break the vial of acid. The chemical reaction of the acid mixing with the filling caused ignition. This method of ignition is similar to one used in Gansters first pattern grenade during the American Civil War.

Early Ball Grenade
Photo- Dimitar Mitev

In December 1895 the movement split into two separate parts, the "Macedonian Committee" headed by Naum Tjufekchiev and the "Supreme Macedonian Committee" headed by General Danail Nikolaev. Bulgarian authorities subsequently suspended relations with the Macedonian Committee and in the spring of 1896 Bulgarian police closed the workshop. The Supreme Macedonian Committee still required a manufacturing facility for grenades. In 1896 Giorche Petrov with the help of a Czech blacksmith, trained another man, Dimitar Zografov, in the manufacture of grenades. Zografov was then sent into Macedonia, which at the time was occupied by the Ottoman Turks, to set up a grenade manufacturing workshop. The workshop set up in late 1896 in a village called Dedino in northeast Macedonia. The workshop functioned for only a short period closing in November 1897.

Petrov established contact with the leaders of an Armenian Revolutionary committee who sent one of their experts to help. A factory was set up near the Bulgarian-Turkish border in a village called Sabljar. This factory produced between 1000 and 1500 grenades in various shapes and weights. Ball, egg, and cubical shapes were all produced in the workshop. The filling was normally the Potassium Chlorate/Sugar mixture. Several types of ignition were used, safety fuze only, safety fuze and detonators, and one similar to the American Civil war Hanes grenade with percussion caps on nipples. For the most part cast iron was used for the bodies but experiments with zinc-lead alloys were also done. The zinc-lead alloy tests were based on the idea that it would be easier to cast in the occupied territories. The factory also produced molds that were sent into Macedonia. The Sabljar factory was discovered by Turkish intelligence in 1898 and subsequently closed by the Bulgarian government after protests from the Turkish government forced the issue.

Handgrenades produced in the factories and in the occupied territories varied considerably making them difficult

to classify with reasonable clarity. Basically, the shapes used were round, egg shaped, or rectangular with sizes varying from 80 to 100 mm. The thickness of the castings also varied from 10 to 30 mm. The material used in the Bulgarian factories was normally cast iron, those made in the occupied territories were normally bronze, and in the Sabljar factory some were made with the zinc-lead alloys. In addition, improvised grenades using glass bottles, tin cans or other suitable containers were filled with dynamite or other high explosive and used with various types of ignition. One improvised type was made from 125 or 250 gram Melinite charges with 6-8 steel rods wired to the outside. The ignition set consisted of safety fuse and a detonator. About 70-80 of these particular grenades were used on 15-18 April 1903 during attacks against Turkish institutions in Solun (now known as Thessaloniki in Greece).

In 1902, Bulgarian Army Engineers performed tests on the grenades being produced by the revolutionaries. The tests proved to be successful and led to the engineers seeking permission to produce a standard grenade for Bulgarian forces. Subsequently two cylindrical patterns were produced in the Artillery Arsenal in Sofia. The testing, conducted in October 1905, gave unsatisfactory results.

The actual revolt in Macedonia and Odrin only lasted about 3 months, from 20 July to 9 October 1903, before being put down by the Ottoman Turks. The handgrenades made in the factories and occupied territories were used to good effect by the revolutionaries but the revolt was doomed to failure.

Early Percussion Grenade
Photo- Dimitar Mitev

In the spring of 1905 General Georgi Vazov (Chief of Engineers) met with Naum Tjufekchiev who offered for inspection 9 different types of grenade. As a result two types were selected and official production of for the Bulgarian Army began in 1906. On 23 March 1906 a contract was let to Naum Tjufekchiev to produce some 48000 grenades in two types. These were the "Makedonia" grenades in both ball and cubical versions (24000 of each). These were the first officially adopted grenades in Bulgarian service.

In 1908 Gancho Budevsky suggested a different type of handgrenade to Bulgarian authorities, in fact a form of offensive grenade with a thin casing. The suggestion was rejected at the time as fragmentation was regarded as a requirement.

The "First Balkan War" (05 Oct 1912 to 17 May 1913), pitted Bulgaria, Greece, Serbia, and Montenegro against the Ottoman Turks. The Second Balkan War took place 16 June 1913 to 28 July 1913 pitting Bulgaria against Romania, Serbia, Greece, and Turkey. The Bulgarian Army used the Makedonia grenades during this period. Smaller numbers of other types, made of sheet iron were also used (about 10000 constructed by Stoyan Velichkov). In addition there were some spherical lead grenades constructed under the direction of General Evstaty Vinarov by the "Danube Fleet" of the Bulgarian Navy in Ruse and about 700 in the Naval HQ in Varna.

Bulgaria entered the First World War on 14 Oct 1915 allying with the Central Powers, Germany, Austro-Hungary, and Turkey. Bulgarian grenades at the time were the "Makedonia" grenades. Colonel Dobrevsky, a Military Engineer, designed the "Odrin" grenade in 1914-15 with the "Odrin" being officially adopted in 1915. The "Odrin" utilized a new type of fuze that was ignited by a percussion cap. This fuze proved more effective and reliable that the fuzes in use with the Makedonia grenades. It is likely that the Makedonia grenades were retrofitted with the new fuzes as they became available. Bulgaria supplied Turkey with large numbers of grenades during the war. "Makedonia" with the Tjufekchiev fuze and "Odrin" models were both supplied and used at

Gallipoli against British, "Anzac", and French troops. Bulgaria also used large numbers of German stick and egg grenades during the First World War.

After WWI, the Bulgarian Army was limited to 20000 soldiers by the Treaty of Neuilly. Any weapons or ammunition supplies over a very low limit were to be turned over to the Allied forces. The Treaty also prohibited importing any type of war materials including weapons and ammunition as well as limiting production in Bulgaria to a single factory. Normal training and a revolt in September of 1923 virtually exhausted supplies of ammunition including grenades. In the mid 1920's Bulgaria began producing two new types of grenade, similar to the German stick grenades. These were both offensive and defensive versions of stick grenades that remained in Bulgarian service up to the 1950's.

During the period of 1941 to 1944 Bulgaria allied itself with Germany. Bulgarian supplies of grenades were supplemented with German grenades as required. Also during this period, British and American aircraft dropped supplies to Bulgarian Communist partisans. Large numbers of British No. 36M Mk. I grenades were included, however much was captured before reaching the partisans. In fact, so many grenades were captured that a manual from the "State Militia School" in 1945 included the No. 36M Mk. I. In late 1944 when Bulgaria switched sides and its forces went into action against the Germans, Bulgarian stick grenades were the main grenades in use, as well as remaining stocks of German grenades, primarily the StHgr 24. In late 1944 and early 1945 some 300,000 Russian grenades were supplied to Bulgarian forces.

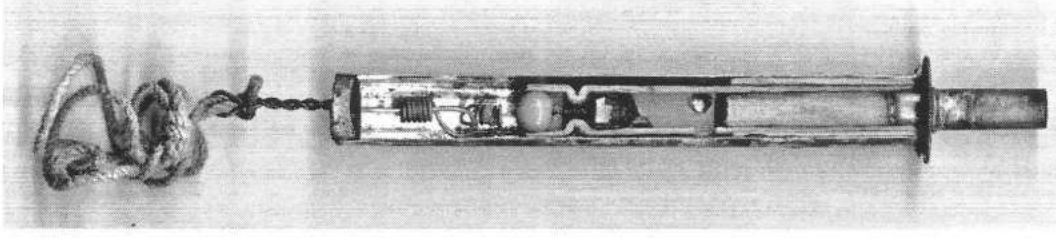
After WWII, in the new "Bulgarian Peoples Army" the Bulgarian designed grenades began to be replaced by Russian models although the Bulgarian grenades and remaining German grenades were used up to the 1950's. Soviet models replaced the Bulgarian grenades, mainly the F1 and RG 42 however some numbers of the RDG 33 were used initially. Apparently initial shipments of the F1 grenade were fitted with Koveshnikov fuzes. The RGD-5 came into service later likely in the late 1960's. In common with most other Warsaw Pact countries, Bulgarian factories manufactured the Soviet designs of grenade, including the F1, RG 42, and later the RGD-5. In the 1980's Bulgaria began to design and manufacture more modern grenades, the RGO 78 and later the RGN-86. These two models are current with Bulgarian forces.

Bulgarian fuze mechanisms

Friction igniters

The friction igniters as used in the Offensive and Defensive stick grenades were modified several times but can be broken down into three basic versions.

The first pattern is very similar to the German fuze it was designed from. There is a tubular container made of tinned sheet iron about 0.5mm thick. The upper end of the tube is belled out to form a support lip. The igniter itself is contained within a cardboard tube that has a brass detonator holder fixed to its upper end. A sheet iron washer is also attached at the base of the detonator holder where it meets the cardboard body. There are two sets of gas escape holes drilled through the cardboard body about 2/3 the way up. A length of safety fuze with an igniter head on the end is fitted into the body with the igniter head closest to the detonator holder. A friction igniter, filled with a friction compound, is then placed in the body and the body crimped to hold it in place. The friction wire that passes through the igniter is coated with red phosphorous on the upper end and leads through the crimp up to the top of the cardboard body. The wire then fits through holes in a glass bead (normally an opaque light blue) that closes the top of the tube. The wire is twisted into a spiral coil that holds the assembly together. A second piece of wire is attached to the friction wire at the spiral coil above the glass bead. The cardboard igniter is fitted through the sheet metal container until the sheet metal disc comes into contact with the belled end of the tube. The second piece of wire protrudes out the other end passing through a sheet metal disc and cork that closes the lower end of the tube. Pitch is used to provide moisture resistance on any joints in the assembly. Finally a pull cord with pull knob attached is tied onto the wire.



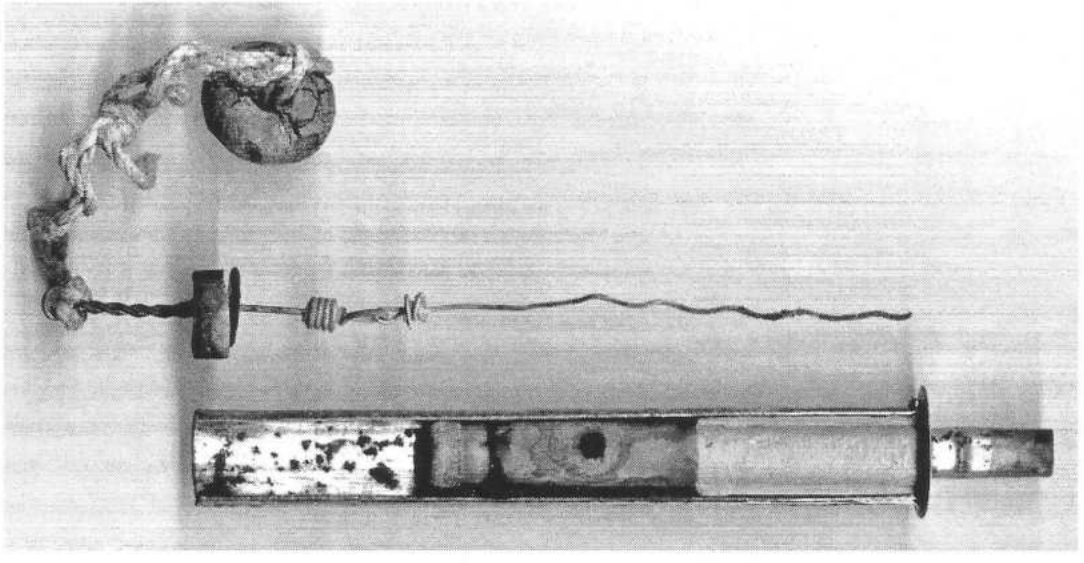
First pattern of the friction igniter.

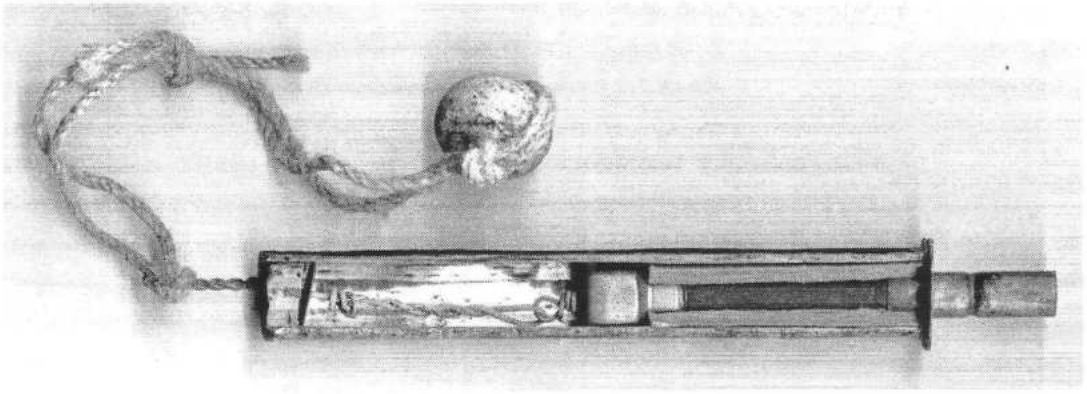
Photo-Dimitar Mitev

The second pattern is constructed the same as the first with the exception of the closing bead for the cardboard body. In this version a small push on zinc cap closes the igniter.

Internal view of the second pattern friction igniter.

Photo-Dimitar Mitev





Internal view of the third pattern friction igniter.

Photo- Dimitar Mitev

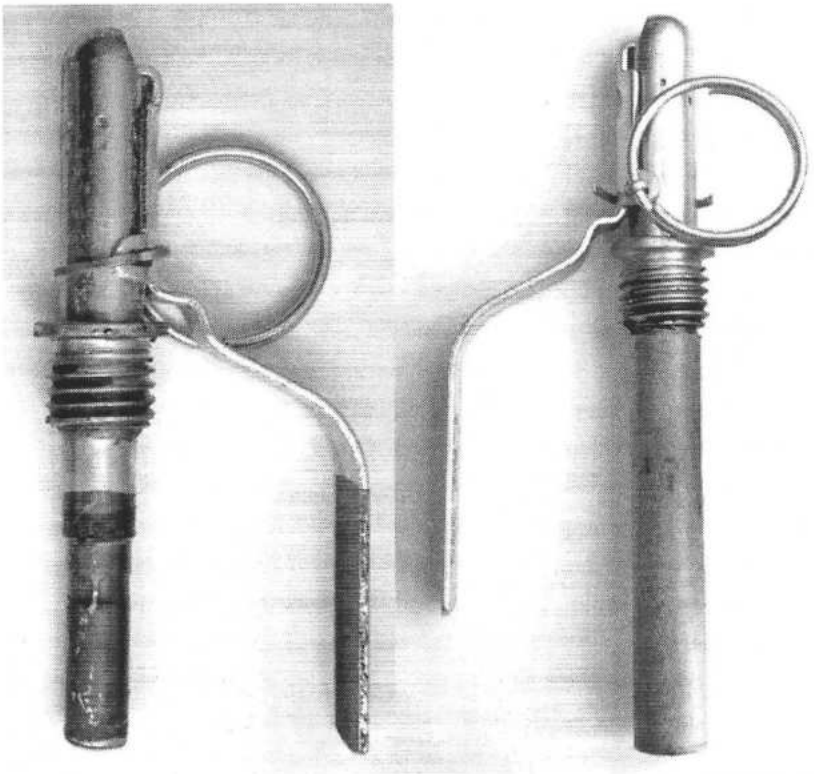
The third pattern is substantially different. It has an outer casing of sheet metal formed into a tube with a belled end. The detonator holder is attached to a brass delay tube with threading on the opposite end. A sheet metal disc is press fitted onto the detonator holder. The brass delay tube contains an ignition head closest to the detonator holder and a pressed delay train. A cardboard sleeve fits over the delay tube that stabilizes it in the outer container. The friction igniter is contained within a brass cup that screws onto the threaded end of the brass delay tube. The top of the igniter is closed by a steel disc with three gas escape holes and a central hole for the friction wire. The igniter is filled with a friction compound with the friction wire, coated with red phosphorous, passing through it. A connecting wire is attached to the friction wire. The igniter is placed in the outer casing with the sheet metal disc meeting the belled end of the casing. The connecting wire passes through a cork that closes the end of the container. The pull cord is attached to the connecting wire. Pitch is used on the assembly to provide moisture resistance.

UZRGM

The Bulgarian version of the UZRGM is identical to the Russian version, differing only in the markings. It is made both with the rounded safety lever and the squared safety lever. It provides a delay of 3.2 to 4.2 seconds.

UZRGM-74-IM

This is a practice fuze, designed for use in the RDG 5 IM grenade and later extended for use in the RGO 78IM practice grenade. It is basically a normal UZRGM mechanism with the detonator assembly replaced by a practice charge assembly made of cardboard. When ignited it produces enough sound, flash and smoke to realistically simulate the explosion of a grenade. It provides a delay of 3.2 to 4.2 seconds.



UZRGM Drill Fuze UZRGM 74IM Practice Fuze

Photos- Dimitar Mitev

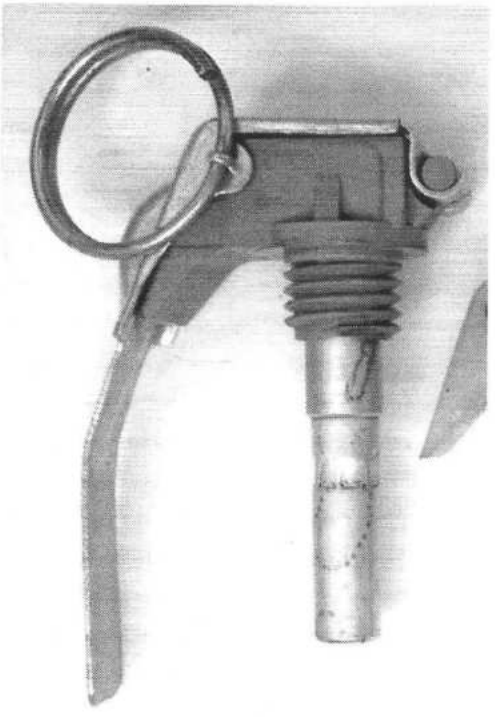
UZRGM Drill

The drill version of the UZRGM is

identical to the live version but is made with inert components. To identify it as a drill fuze, a purple lacquer is applied to the fuze. The lacquer may be applied to part or all of the fuze.

DVM

The DVM fuze (sometimes known as DVM-78 or DVM-1) mechanism is the standard fuze mechanism used in Bulgarian grenades. It is a fairly standard type percussion fuze mechanism. The main housing is made of plastic and may be found in green or a light tan. Threading is the same as the UZRGM so earlier grenades normally fitted with the UZRGM could be retrofitted with the new fuze providing the shape of the safety lever allows it. The fuze provides a delay of 3.2 to 4.0 seconds after ignition.



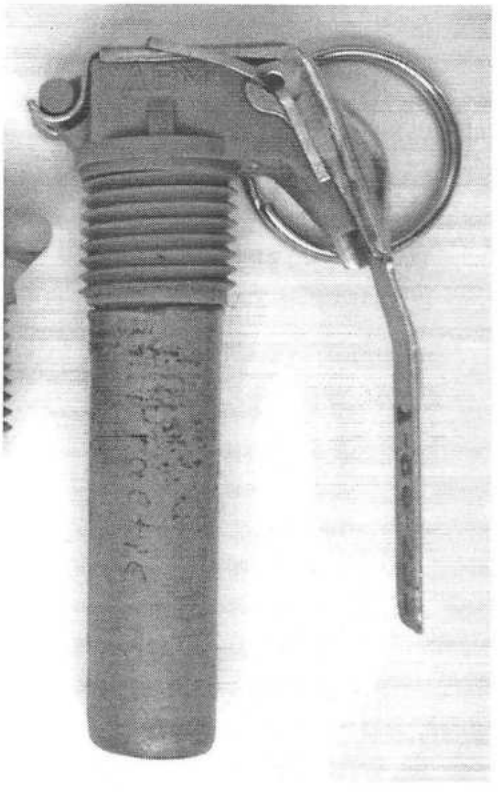
DVM Drill Fuze
Photo- Dimitar Mitev

DVM-IM

This is a practice version of the DVM fuze, designed for use in the RGO-IM and RGN-IM practice grenades. To ensure safety, the threading on the practice fuze is larger than that on the live fuze so they cannot be interchanged. The fuze is similar to the live version but has a practice charge contained in a plastic housing attached in place of the detonator. The fuze provides a delay of 3.2 to 4.0 seconds.

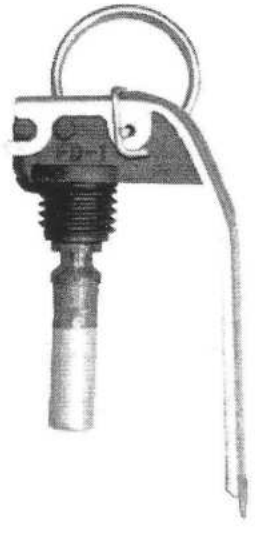
DVM drill fuze.

The drill DVM fuze is identical to the live fuze but has inert components.



DVM-IM Fuze
Photo- Dimitar Mitev

FD-1

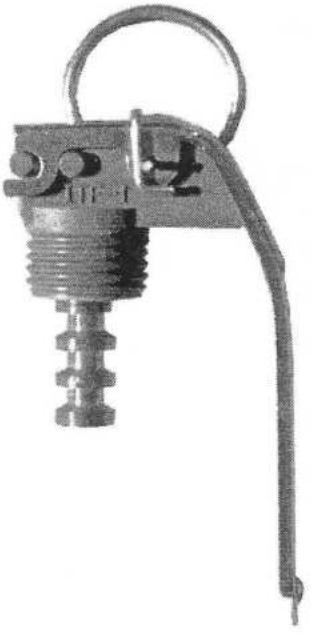


FD-1 Fuze
Photo- Arsenal BG

This fuze mechanism is manufactured by Arsenal BG. It is unknown if it has been adopted by Bulgarian Forces rather it may be only offered for foreign sales. The fuze housing is black plastic with the designation molded onto the side. The safety lever is metal. A detonator is attached to the bottom of the fuze mechanism. It is designed for use with fragmentation or offensive grenades, in particular the GHO-1, GHD- 1 and GHD-2. The fuze has a delay of 3.2 to 4.2 seconds.

ITF-1

This fuze mechanism is manufactured by Arsenal BG. It is unknown if it has been



ITF-1 Fuze mechanism
Photo- Arsenal BG

adopted by Bulgarian Forces rather it may be only offered for foreign sales. The fuze housing is green plastic with the designation molded onto the side. The threading on the base is larger that that used with offensive/fragmentation grenades to ensure the correct fuze mechanisms are used. The safety lever is metal. A ignition element is attached to the bottom of the fuze mechanism. It is designed for use with smoke, gas, or distraction grenades. The fuze has a delay of 1.5 to 2.5 seconds.

Makedonia Grenades

The Makedonia grenades were the first to be officially adopted by the Bulgarian Army. They were manufactured by Naum Tjufekchiev on a contract with the Bulgarian Army starting in 1906. The first contract was for 48000 grenades in two types. The contract allowed for 24000 ball grenades, 24000 cubical grenades, 10000 fuzes, and 10000 detonators. This was the grenade most used during both "Balkan" wars.

Makedonia Spherical Grenade

Makedonia Spherical

TYPE- Fragmentation
WEIGHT- 630-760 gm
DIAMETER- 72 mm
FILLING- 80-100 gm
IGNITER- Matchhead fuze
FUZE DELAY- 8 sec.

The spherical grenade is a cast iron ball with internal segmentation. The body walls are about 7 mm thick. There is a large threaded hole in top that is closed by a knurled brass or cast iron plug. The plug has a hole in the middle for the fuze and two closed holes on either side of the middle hole that are used to tighten the plug. When screwed into position, the plug holds a brass adapter in place. The adapter forms a clamp to hold the fuze in place when fitted. A small wooden plug closes the hole in the centre of the plug when the grenade is not fitted with a fuze. The grenade body was filled with 80-100 grams of Bombit.

Makedonia Spherical Grenade
Photo- B. Bosman

The body is painted with a black or grey coloured lacquer. The adapter may have the initials NT (for Naum Tjufekchiev) in script engraved on the upper side.

At this point the ignition system was simply a length of fuze with a detonator on one end and a matchhead lighter on the other.

Makedonia Cubical Grenade

Makedonia Cubical

TYPE- Fragmentation
WEIGHT- 1410 gm
SIZE- 72 mm square
FILLING- 150 gm
IGNITER- Matchhead fuze
FUZE DELAY- 8 sec.

The cubical version is also made of cast iron and has walls about 9 mm thick. The body is internally segmented to improve fragmentation. The body basically square, approximately 72 mm on each side. A hole in top is threaded to accept a cast iron plug. The body is filled with 150 grams of Bombit.

At this point the ignition system was simply a length of fuze with a detonator on one end and a matchhead lighter on the other.

A new fuze was developed by Naum Tjufekchiev and subsequently known as the "Tjufekchiev System". The fuze body consists of a brass plug, threaded to fit the holes in the Makedonia grenades, with a wood plug in the centre. The top is closed by a press fit brass plug with a slot on the side and a hole in top directly over the hole in the wood plug. There are two holes in the wooden plug; one drilled off to one side completely through, the other drilled half way through from the bottom on the other side. The fuze consists of a length of fuze with a matchead on one end and detonator on the other. The fuze is fitted into the body by putting the matchead end in

Makedonia Cubical Grenade
Photo- Dimitar Mitev

the open hole in the wood plug and bent around with the detonator fitting into the closed hole. The igniter consists of a cardboard strip coated with a mixture of red phosphorous and glass dust. A hole on one end of the strip allows a 15 cm cord to be attached with the other end attached to the safety cap. A brass container is fitted over the friction strip to keep it safe. The friction strip fits into the fuze body through the slot in the side. The safety cap is fitted through the hole in the cap fitting over the end of the matchead on the fuze.

For use, the grenade is grasped in one hand with the other hand grasping the cord and safety cap. Remove the safety cap, which exposes the matchead on the fuze, and sharply pull on the cord. The cord draws the friction strip out of the protective brass container and draws it across the matchead of the fuze causing it to ignite. The grenade is immediately thrown and after a delay of 5-7 seconds the grenade will detonate.

During the Balkan wars, mainly the earlier type fuze was used. We can assume the "Tjufekchiev System" igniters were fitted to the grenades afterwards although some numbers were likely used during the war. During WWI, the Makedonia grenade was used again but had been mainly fitted with the new type "Odrin" fuze although some supplied to the Turks were still fitted with the Tjufekchiev fuzes . The Odrin fuze was substantially heavier than the earlier fuzes used with the Makedonia grenades. Use of the Odrin type fuze increased the weight of both grenades by about 70 gm.

Makedonia Drill Grenades

The drill versions of the Makedonia grenade use a normal body filled with sand and have no fuze assembly in the igniter.

Odrin Grenade

The "Odrin" grenade is a defensive type, designed by Col. Dobrevsky in 1914-15. Officially adopted by the Bulgarian army in 1915 it was used by Bulgaria throughout WW I and possibly during WWII. It was also supplied to Turkey during WWI.

The body is a cast iron sphere with segmentation on the outside. The walls of the body are about 7 mm thick. A large hole in top is threaded to accept the igniter mechanism. When the igniter mechanism is screwed in, a leather washer is used and the threads coated with "Artillery Grease" to seal the grenade from moisture. The body was normally painted black or varnished with a black lacquer.

Odrin Grenade
Photo- Dimitar Mitev

Odrin

TYPE- Fragmentation
WEIGHT- 760-770 gm
DIAMETER- 72mm
FILLING- 100 gm Bombit (Cheddite) or
110 gm Balkanit (Ammonal)
IGNITER- Percussion
FUZE DELAY- 8 sec.

The igniter mechanism is made of bronze and consists of a cap, body,

Odrin Grenade Disassembled
Photo- Dimitar Mitev

fuze, percussion cap, and detonator. The main body of the igniter is threaded on the bottom to match the threading in the body of the grenade. The top portion, above a knurled lip, is of smaller diameter and is threaded to match the cap. The knurled ring around the body has one square notch machined into it to fit the tightening wrench. There are five holes through the body; a central hole for the percussion cap and four smaller holes surrounding it to provide gas escape for the burning fuze. The delay fuze is contained within the body fitting through a hole up to the top section. A percussion cap is cemented in its hole or on a nipple with the end of the fuze below it. The fuze is coiled in the bottom of the body and covered with a disc that closes the bottom of the igniter. The bottom end of the fuze fits through a hole in the centre of the disc and has a detonator crimped on. The top of the igniter mechanism is closed by a brass cap with a knurled ring to provide a firm gripping surface.

When the grenade is to be used, the cap is unscrewed, the top of the grenade struck against any handy hard object, the fuze checked to see if it is smoking (ignited), and the grenade thrown immediately. When the top is struck, the percussion cap fires and ignites the fuze, the fuze burns down for a period of up to eight seconds until it reaches the detonator. The burning fuze causes the detonator to fire and initiate the main explosive charge.

Odrin Practice Grenade

Practice versions of the Odrin were produced for training purposes. The grenade is similar to the live grenade but has 5 holes, 1-1.5 cm diameter, through the body to provide gas escape for the practice charges. The igniter mechanism anvil is steel to withstand repeated use and the charge is a small paper cartridge filled with black powder.

The practice grenade is used in exactly the same manner as a live grenade. Once used the grenades could be gathered up to have the practice charges replaced. Replacing the charge involved fitting a new percussion cap, fuze, and practice charge. To simplify reloading the fuze is not coiled into the mechanism.

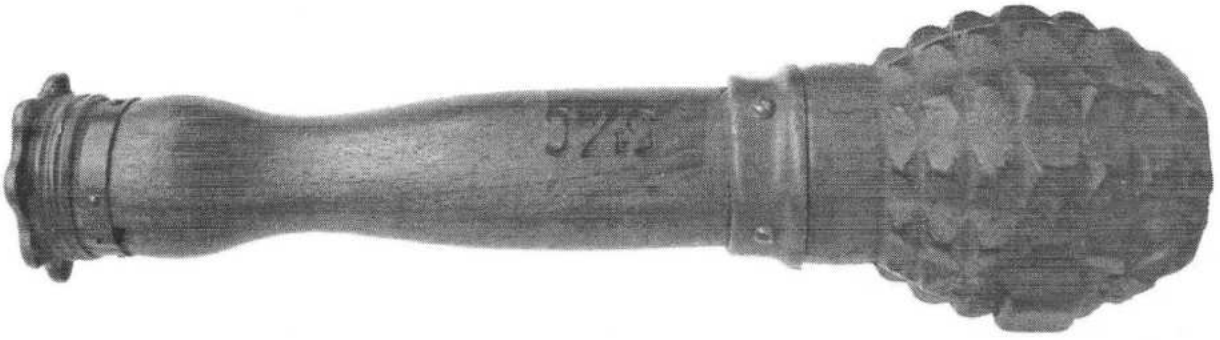
Stick Grenade, Defensive

This grenade was developed in the mid 1920's remaining in service with Bulgarian forces through WWII, into the 1950's.

The grenade consists of three main components, the warhead, handle, and friction igniter. The warhead consists of a cast iron head with segmentation on the outside. One side of the head has been flattened and has a belt clip cast onto the flat side. The head is filled with 130 grams of TNT. The base is closed by a thin sheet metal detonator well that is held in place by a pressed lead ring in the hole in the bottom. The base is formed to have a threaded socket in the centre. The handle is mainly wood. An adapter is attached to the top end with four small wood screws or nails. The adapter is sheet metal and covers the top of the handle and down the side a short distance. It is threaded to match the threading in the head of the grenade. A hole in the top allows the detonator to

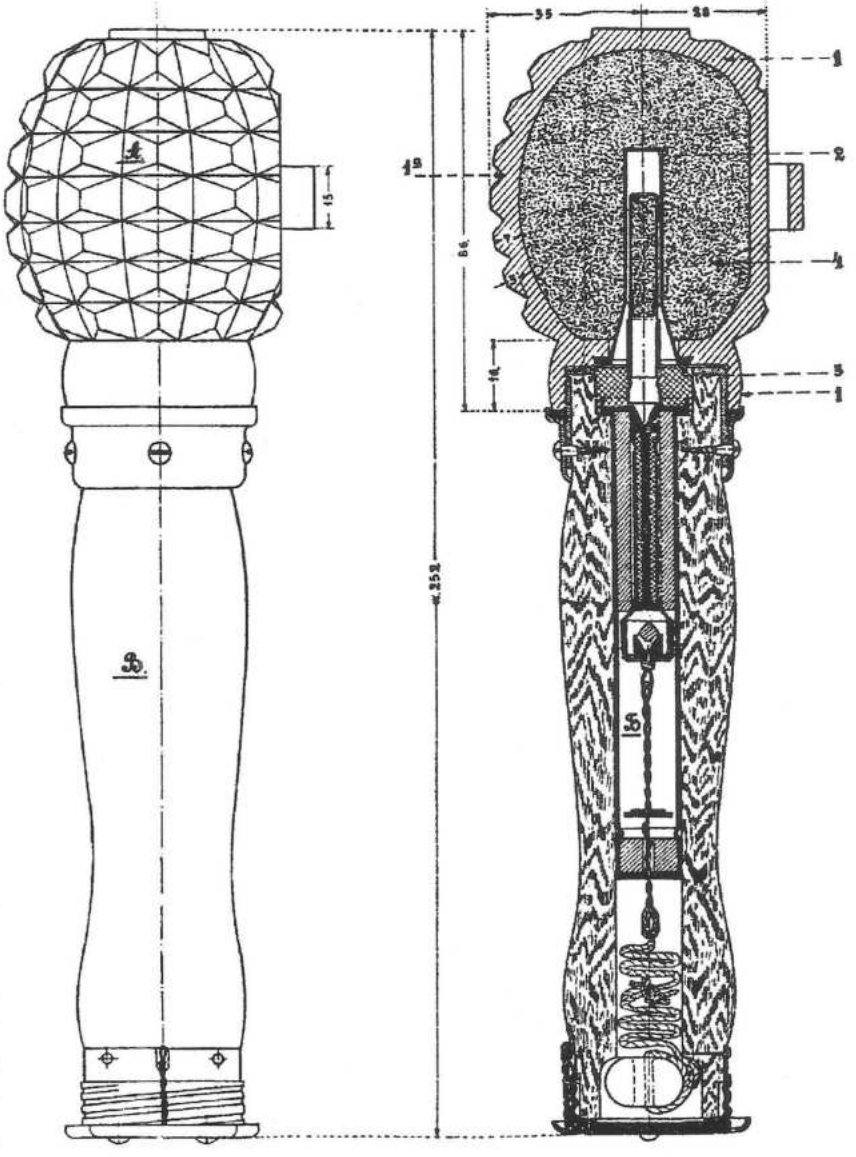
Defensive Stick Grenade

TYPE- Defensive
WEIGHT- 900-950 gm
DIAMETER- 70 mm
LENGTH- Total 257 mm
Body 87-88 mm
FILLING- 120-130 gm TNT
IGNITER- Friction
DETONATOR- Nr. 8
FUZE DELAY- 5.5 sec.



Defensive Stick Grenade, Photo- Dimitar Mitev

fit through the top of the handle into the head. The base of the handle has another adapter attached with small nails. This adapter is threaded to accept a cap both made of sheet zinc. The friction igniter with detonator attached fits into the handle from the top. A string attached to the friction wire fits all the way through into a space in the bottom of the handle and is attached to a pull ball. The cap on the handle keeps the pull ball and string inside the handle. Once assembled with the igniter the handle is then screwed into the socket in the base of the head.



The head of the grenade is painted a grey-green color, the wooden portion of the handle is unpainted, the adapter is also painted grey-green. The handle has the delay time stamped into it just below the adapter at the top of the handle.

For use, the grenade must be primed by unscrewing the body of the grenade in a counter clockwise direction. Insert the detonator in the detonator holder of the igniter and screw the body back on. To throw, unscrew the cap and allow the pull ball and string to drop out. Grasp the ball with the non-throwing hand and give it a sharp pull. Immediately throw the grenade at the target. When the pull string is pulled, it pulls the friction wire through the friction compound causing it to flash. The flash ignites the delay fuze that burns for about 5.5 seconds. When the fuze burns down, it ignites a small

flash charge that flashes into the detonator causing it to detonate. The explosion of the detonator causes the main charge to detonate.

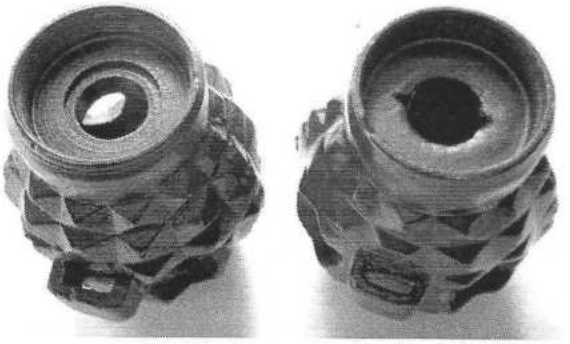
When the grenade explodes the body normally bursts into 90-100 fragments weighing 1 to 5 grams. The grenade produces an effective radius of 3 to 4 metres but fragments are dangerous out to 30-40 metres.

Defensive Practice Grenade

This is the practice version of the Defensive stick grenade, it can reasonably be assumed that it came into service about the same time as the live version and remained in service as long as the live grenade.

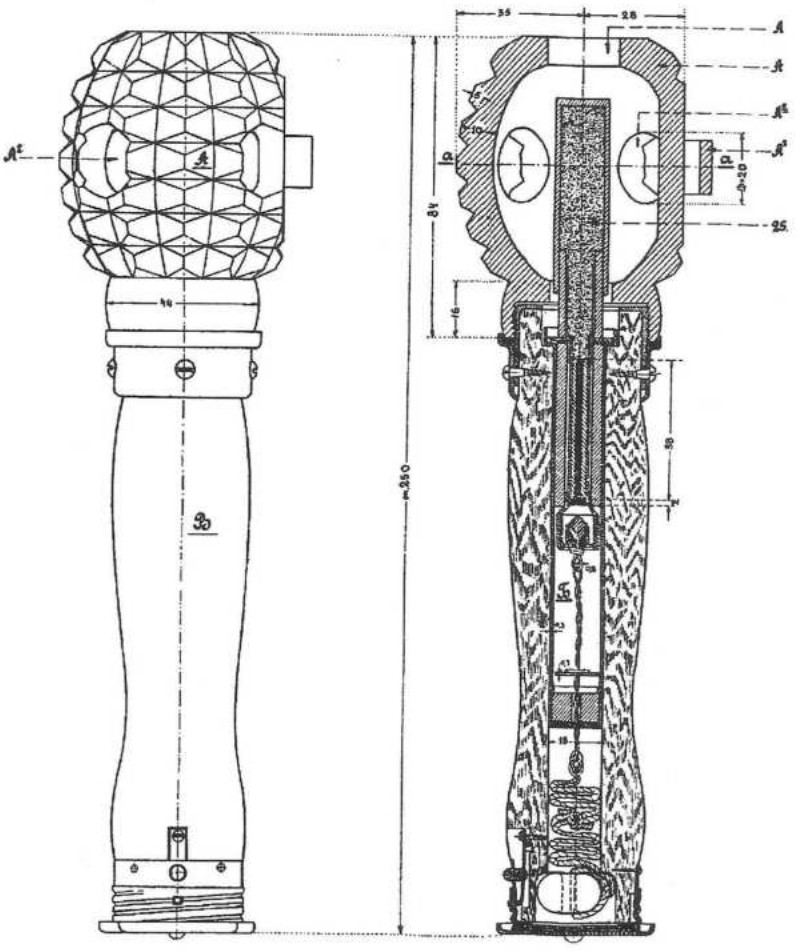
Defensive Practice Grenade

TYPE- Practice
WEIGHT- 900 gm
DIAMETER- 70 mm
LENGTH- Total 255 mm
Body 86 mm
FILLING- Practice Charge
IGNITER- Friction
FUZE DELAY- 5.5 sec.



Two versions of the practice grenade heads
Photo- Dimitar Mitev

The grenade consists of three main components, the head, handle, and friction igniter mechanism. The head is cast iron with thicker walls than the live grenade so it brings the weight up to that of the live grenade. There are four 20mm holes around the circumference of the body and one in the top to allow gas and smoke escape. The base is formed to have a threaded socket in the centre. A belt clip is cast onto the flat side of the head. The handle is mainly wood. An adapter is attached to the top end with four small wood screws or nails. The adapter is sheet metal and covers the top of the handle and down the side a short distance. It is threaded to match the threading in the head of the grenade. A hole in the top allows the practice charge to fit through the top of the handle into the head. The base of the handle has another collar that is attached with small nails. This collar is threaded to accept a cap. The friction igniter with practice charge attached fits into the handle from the top. The igniter is the same as used with the live grenade but has the practice charge glued on in place of a detonator. The practice charge is a cardboard cartridge containing 7-8 grams of black powder.



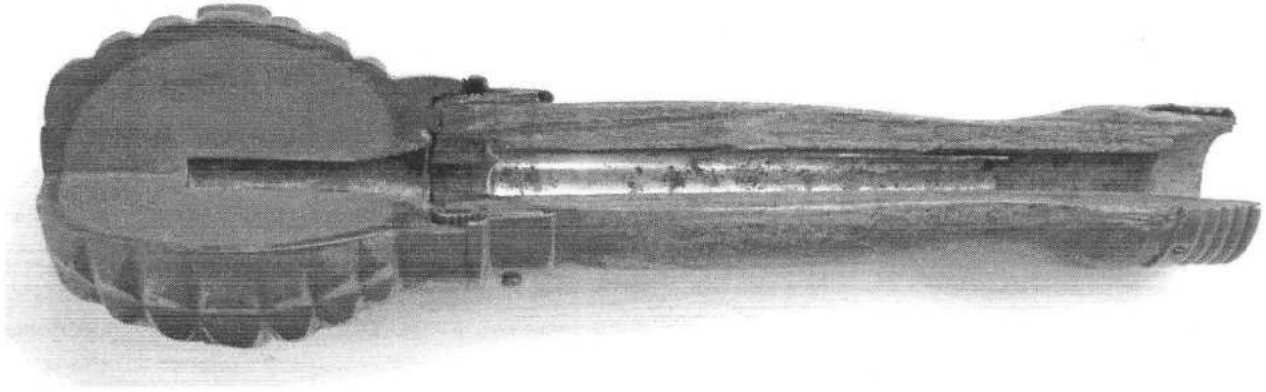
The head of the grenade is normally found painted black or unpainted. Official documents from 1930 list it as being painted red however these are rarely found. It is likely that due to the long service the

markings changed at some point and the older grenades were repainted to conform to the new marking scheme.

For use, unscrew the cap and allow the pull ball and string to drop out. Grasp the ball with the non-throwing hand and give it a sharp pull. Immediately throw the grenade at the target. When the pull string is pulled, it pulls the friction wire through a friction compound causing it to flash. The flash ignites the delay fuze that burns for about 5.5 seconds. When the fuze burns down, it ignites the practice charge. The practice charge gives a loud bang and produces a small amount of smoke to indicate the detonation of a grenade.

The grenade is reloadable by unscrewing the head and replacing the friction igniter and practice charge that are supplied as a single unit. The practice charges were reloadable but were returned to the factory for reloading.

Instructional Defensive Grenades



Instructional Defensive Grenade, Photo- Dimitar Mitev

In addition to the live and practice grenades, there were sectioned grenades produced for classroom instruction, it is also likely there were inert versions produced for classroom instruction.

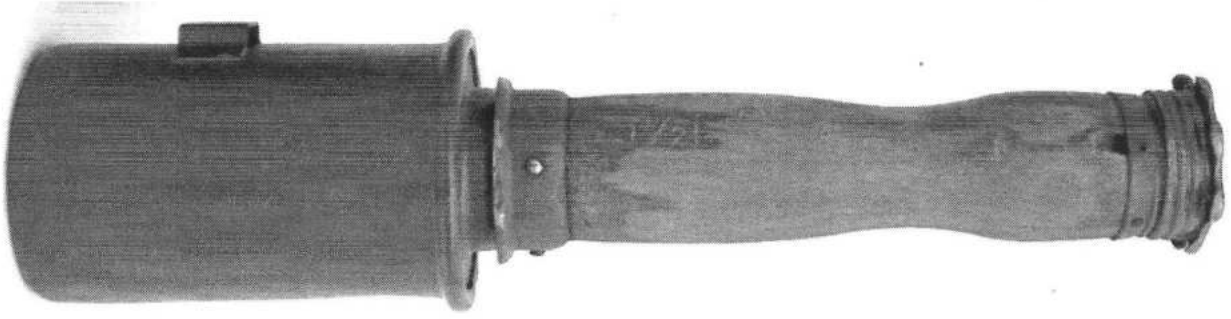
Stick Grenade, Offensive

This grenade was developed in the mid 1920's and remained in service with Bulgarian forces through WWII and into the 1950's.

The grenade consists of three main components, the warhead, handle, and friction igniter mechanism. The warhead consists of a dropforged tin with a base that is crimped on. The walls are constructed of sheet iron 0.9 - 1.5 mm thick. The head is filled with 310-350 grams of TNT or Ammonal. A thin sheet metal cover closes the base with a detonator well formed in the centre. A heavier base fits over the thin cover and both are then crimped onto the main body. The heavier base is formed to have a threaded socket in the centre. A belt clip is attached to the side of the head. The handle is mainly wood. An adapter is attached to the top end with four small wood screws or nails. The adapter is sheet metal and covers the top of the handle and down the side a short distance. It is threaded to match the threading in the head of the grenade. A hole in the top allows the detonator to fit through the top of the handle into the head. The base of the handle has sheet zinc adapter that is attached with small nails. This adapter is

Offensive Stick Grenade

TYPE- Offensive
WEIGHT- 710-715 gm
DIAMETER- 61.5 mm
LENGTH- Total 277 mm
Body 107 - 108 mm
FILLING- 310-350 gm TNT or Ammonal
IGNITER- Friction
DETONATOR- Nr. 8
FUZE DELAY- 5.5 sec.
EFFECTIVE RADIUS- 5 metres



Offensive Stick Grenade, Photo- Dimitar Mitev

roll threaded to accept a zinc cap. The friction igniter with detonator attached fits into the handle from the top. A string attached to the friction wire fits all the way through into a space in the bottom of the handle and is attached to a pull ball. The cap on the handle keeps the pull ball and string inside the handle. Once assembled with the igniter the handle is then screwed into the socket in the base of the head.

For use, the grenade must be primed by unscrewing the body of the grenade in a counter clockwise direction. Insert the detonator in the detonator holder of the igniter and screw the body back on. To throw, unscrew the cap and allow the pull ball and string to drop out. Grasp the ball with the non-throwing hand and give it a sharp pull. Immediately throw the grenade at the target. When the pull string is pulled, it pulls the friction wire through the friction compound causing it to flash. The flash ignites the delay fuze that burns for about 5.5 seconds. When the fuze burns down, it ignites a small flash charge that flashes into the detonator causing it to detonate. The explosion of the detonator causes the main charge to detonate.

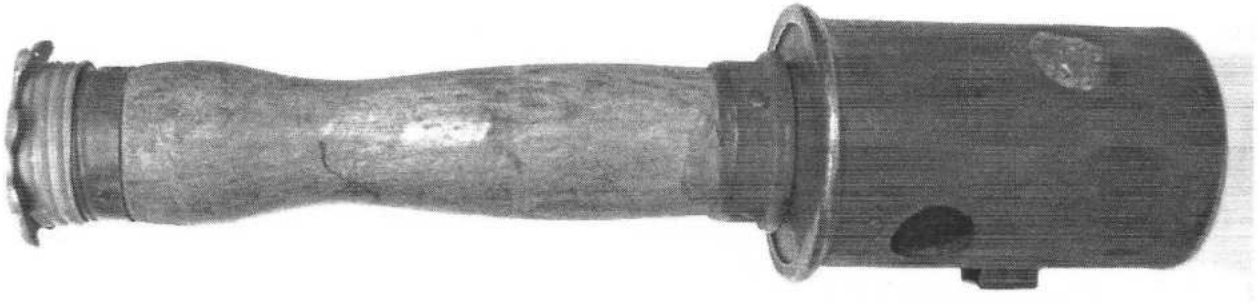
Practice Offensive Grenade

TYPE- Practice
WEIGHT- 650 gm
DIAMETER- 69 mm max
LENGTH- Total 277 mm
Body 107-108 mm
FILLING- Practice charge
IGNITER- Friction
FUZE DELAY- 5.5 sec.

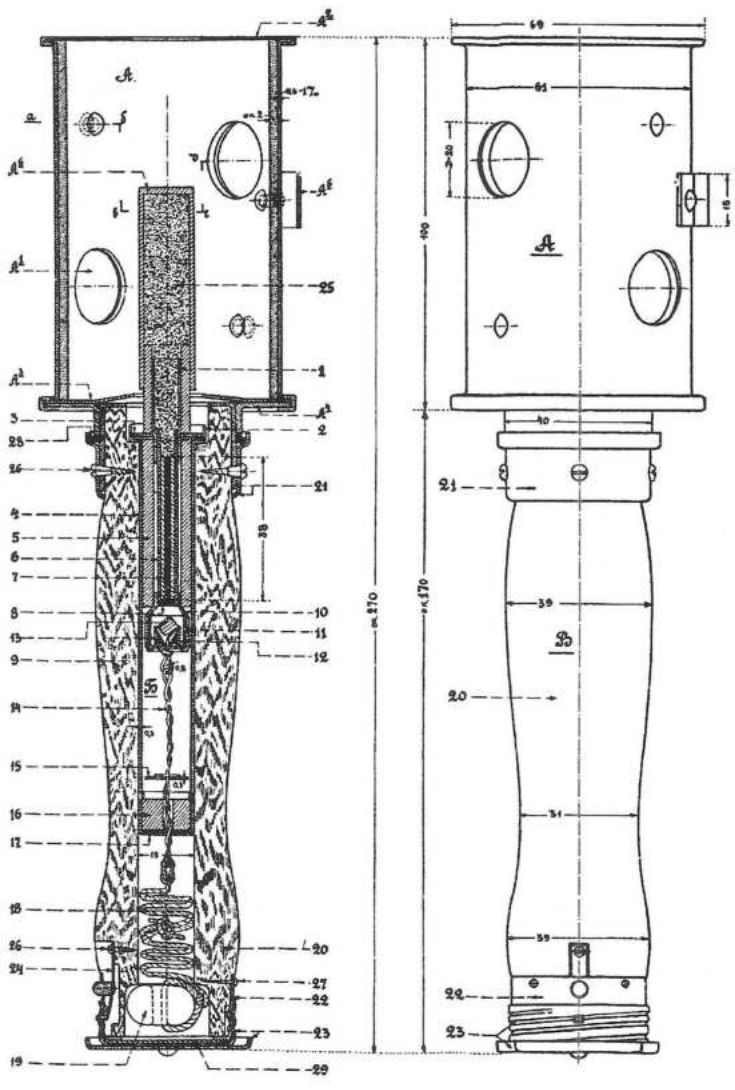
Offensive Practice Grenade

This is the practice version of the Offensive stick grenade, it can reasonably be assumed that it came into service about the same time as the live version and remained in service as long as the live grenade.

The grenade consists of three main components, the head, handle, and friction igniter mechanism. The head consists of a tin with top and bottom crimped on. The walls are constructed of sheet iron and have a reinforcing cylinder riveted into it. The reinforcing cylinder also adds weight to the grenade to bring it close to the weight



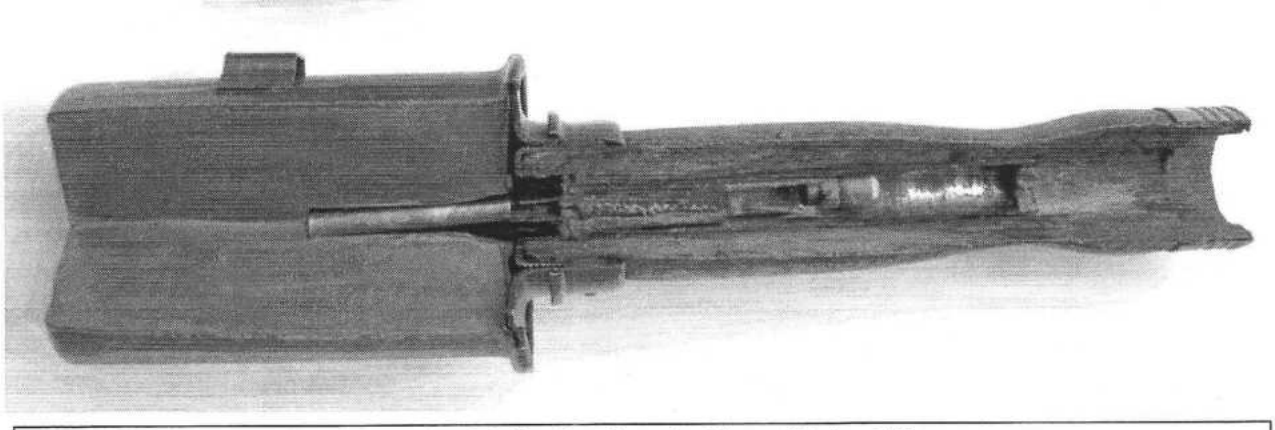
Practice Offensive Stick Grenade, Photo- Dimitar Mitev



of a live grenade. A thin sheet metal cover closes the base with a hole in the centre. A heavier base fits over the thin cover and both are then crimped onto the main body. The heavier base is formed to have a threaded socket in the centre. A belt clip is riveted to the side of the head. There are four holes in the sidewalls of the body and one in the top. The handle is mainly wood. An adapter is attached to the top end with four small wood screws or nails. The adapter is sheet metal and covers the top of the handle and down the side a short distance. It is threaded to match the threading in the head of the grenade. A hole in the top allows the igniter and practice charge to fit through the top of the handle. The base of the handle has a collar that is attached with small nails. This collar is threaded to accept a cap. The friction igniter with practice charge attached fits into the handle from the top. The igniter is the same as used with the live grenade but has the practice charge glued on in place of a detonator. The practice charge is a cardboard cartridge containing 7-8 grams of black powder.

The head of the grenade is painted black or may be unpainted. Documents from the 1930's indicate they may have been painted red but with the long service of the grenade it is likely that the marking scheme changed and the older grenades were repainted in the new scheme. The handles are unpainted.

For use, unscrew the cap and allow the pull ball and string to drop out. Grasp the ball with the non- throwing hand and give it a sharp pull. Immediately throw the grenade at the target. When the pull string is pulled, it pulls



Instructional Offensive Grenade Photo- Dimitar Mitev

the friction wire through a friction compound causing it to flash. The flash ignites the delay fuze that burns for about 5.5 seconds. When the fuze burns down, it ignites the practice charge. The practice charge gives a loud bang and produces a small amount of smoke to indicate the detonation of a grenade.

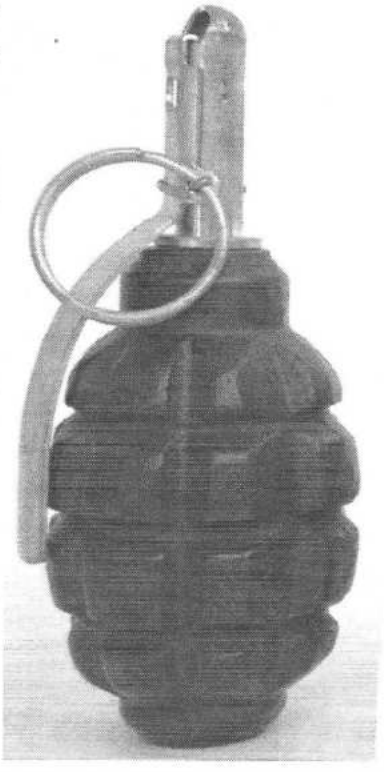
The grenade is reloadable by unscrewing the head and replacing the friction igniter and practice charge that are supplied as a single unit. The practice charges were reloadable but were returned to the factory for reloading.

Instructional Offensive Grenade

In addition to the live and practice grenades, there were sectioned grenades produced for classroom instruction, it is also likely there were inert versions produced for classroom instruction.

F1

The F1 entered service in Bulgaria in the 1950's remaining in service until the 1980's. Stocks were initially from Russian sources but later were produced in Bulgarian facilities. Some stocks used the Koveshnikov fuze initially, later the UZRG, and even later the UZRGM. The Koveshnikov fuzes, likely Russian production only, were classified in the fourth category during the 1960's meaning that they were a last resort for use. It is it highly unlikely that any were actually left in stock at that point. The UZRG fuses were prohibited from training use in the 1980's, again its unlikely there were many, if any, still in stocks at that point.



F1
Photo- Dimitar Mitev

F1
TYPE- Fragmentation
WEIGHT- 540-600 gm
DIAMETER- 54-55 mm
LENGTH- Body 80-85 mm
FILLING- 45-60 gm TNT
IGNITER- Koveshnikov, UZRG, or UZRGM
FUZE DELAY- 3.5-4.5, 3.2–4.0, 3.2–4.2 sec.
EFFECTIVE RADIUS- 20 metres

The body is identical to Russian manufactured grenades making it difficult to tell them apart as is normal with most Warsaw Pact countries. After filling the top of the grenade is closed by a closed cardboard tube that forms the fuze well. In storage the fuze well is closed by a bakelite or plastic plug.

The body may be found with a number cast into a fragment in the bottom row. Typically the body is painted green with no other painted markings. In the later lots of grenades a 12 mm round label may be found on the bottom marked with the year of manufacture. Bulgarian F1 grenades are packed in wooden cases containing 20 grenades fitted with plugs. The igniter mechanisms are packed in two hermetically sealed tins (10 each) within the same case.

F1U

The body is identical to the live versions but is filled with Gypsum instead of TNT. The fuze mechanism is also identical to the live versions but has an empty delay/detonator section with a hole drilled through and the percussion

F1U
Photo- Dimitar Mitev

F1 Throwing practice
Photo- Dimitar Mitev

cap is not fitted. The body of the grenade is painted a deep reddish purple and the drill fuzes are entirely coated with a translucent red/purple lacquer for identification.

F1U

TYPE- Drill
WEIGHT- 540-600 gm
DIAMETER- 54-55 mm
LENGTH- Body 80-85 mm
FILLING- Gypsum
IGNITER- UZRGM Drill

URG

The Bulgarian version of the URG appears to be virtually identical to the Russian version. The body is the same as the live grenade but has a large hole in the bottom to allow the gases and smoke produced by the practice charge to escape.

The UZRGM-74IM fuze is identical to a live fuze but in place of the detonator has a cardboard casing filled with black powder.

The grenade is painted black with white lines both horizontally and vertically.

URG

TYPE- Practice
WEIGHT- 600 gm
DIAMETER- 54-55 mm
LENGTH- Body 80-85 mm
FILLING- Practice charge
IGNITER- UZRGM 74IM
FUZE DELAY- 3.2 - 4.2 sec.

F1 Training

Designed simply to provide an inexpensive, reusable item to practice throwing hand grenades accurately, this grenade is about as simple as it gets.

The body is a solid aluminum casting resembling an F1 grenade and has a steel rod through the centre. The rod protrudes from the top resembling the fuze mechanism.

The grenade may be painted either dark grey or orange.

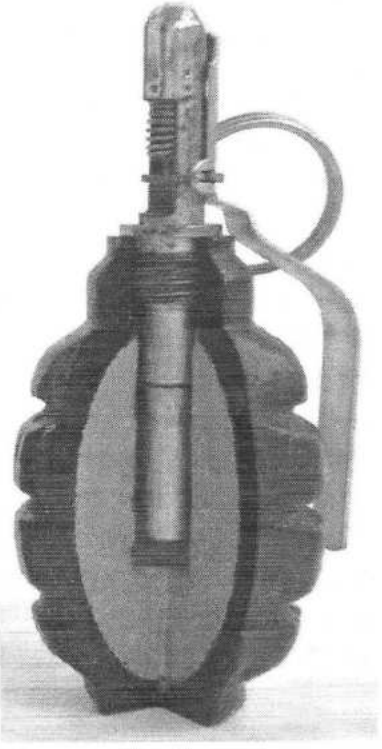
F1 Instructional

This is an inert sectioned grenade used for classroom instruction on the grenade. It is very similar to other Warsaw Pact manufactured training grenades. The body is filled with gypsum to simulate the filling.

F1 Throwing Practice

TYPE- Drill, throwing practice.
WEIGHT- 618 gm
DIAMETER- 54-55 mm
LENGTH- 80-85 mm

The body of the grenade is painted green, the exposed filling yellow, and the cut edges of the body black. The fuze mechanism is also cut out to show the internal workings.



F1 Instructional
Photo- Dimitar Mitev

RG 42

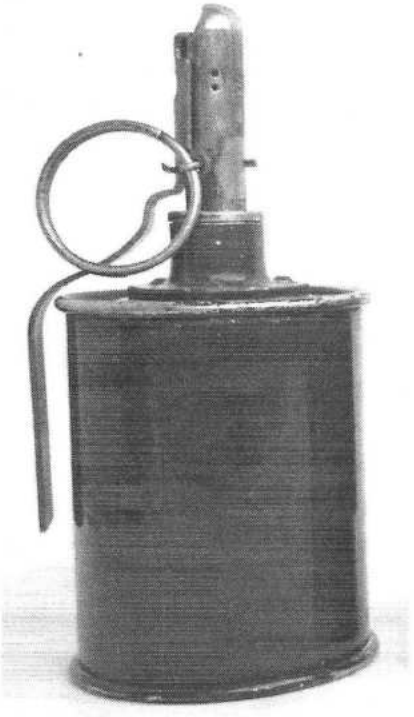
The RG42 was adopted in Bulgaria in the 1950's to replace the older Bulgarian designed grenades. In concert with other Warsaw Pact countries Bulgaria began to manufacture its own shortly afterwards. Initial deliveries

RG 42

TYPE- Fragmentation
WEIGHT- 420 gm
DIAMETER- 55 mm
LENGTH- with igniter UZRG 121 mm
UZRGM 126 mm
without igniter 85 mm
FILLING- 110-118 gm TNT
IGNITER- UZRG or UZRGM
FUZE DELAY- 3.2 - 4.2 sec.

were from Soviet stocks.

The body is in the form of a tin can with a bottom seamed on. A steel belt wound in three or four layers, is inserted into the body against the outer walls. The steel belt is preingraved in small squares to aid in its breakup. The explosive charge is placed into the body and an inner top with fuze well is placed on top of the filling with the fuze well protruding down into the centre of the filling. The top is formed of the top cap with a threaded flange welded to the centre. The top is then seamed onto the body to complete the grenade. The flange is internally threaded to accept the UZRG, and later the UZRGM fuze mechanism.



RG 42U
Photo- Dimitar Mitev

The grenade is normally issued separately from the fuze mechanisms. Initially a wooden plug was inserted into the detonator well to protect and seal the grenade. Later issues had either a plastic plug or metal cap.

Prior to combat the grenade must be primed by removing the plug or cap, and screwing in either a UZRG or UZRGM fuze mechanism.

For use the safety pin is pulled and the grenade thrown at the target, the striker, under pressure of the striker spring is forced down throwing the safety lever off in the process. The striker guided by the guide washer hits the percussion cap, which then fires and ignites the delay element. The delay element burns down for a delay of 3.2 – 4.2 seconds before reaching and initiating the detonator. The detonator fires and initiates the main charge of the grenade. The steel belt in the grenade produces a limited fragmentation effect.

The grenade is painted olive green with markings in black.

RG 42IM

The body of the grenade is the same shape and size as the live grenade. The body is constructed of 3 mm sheet iron and has a central steel chamber threaded at the top to fit the fuze mechanism. The central chamber is welded to the top cap and runs through the entire body with the bottom end open to allow the gases and smoke from the exploding practice charge to escape. The tube is also welded to the bottom cap. The space between the chamber and walls of the body is empty; the weight of the sheet iron being sufficient to simulate the weight of a live grenade. The grenade construction ensures the body is reusable many times, as long as it remains in good condition without cracks. The UZRGM-74IM fuze

RG 42IM

TYPE- Practice
WEIGHT- 390-410 gm
DIAMETER- 59 mm
LENGTH- with igniter 130 mm
without igniter 88 mm
IGNITER- UZRGM-74IM
FUZE DELAY- 3.2 - 4.2 sec.

RG 42IM
Photo- Dimitar Mitev

mechanism with practice charge screws into the top end of the tube.

When ignited, the gases and smoke produced by the practice charge escapes through the open bottom of the tube.

The body is painted black with markings in white. Markings give the designation of the grenade in Cyrillic lettering.

RG 42 Throwing Dummy
Photo- Dimitar Mitev

RG 42U

RG 42U

TYPE- Drill
WEIGHT- 435 gm
DIAMETER- 55 mm
LENGTH- with igniter 126 mm
without igniter 85 mm
FILLING- Inert
IGNITER- UZRG or UZRGM Drill

This is a drill version of the RG 42 used for classroom instruction. The grenade is made exactly like the live grenade but has inert components. It may be filled with an inert filling but is more often found with a coiled steel belt in addition to the normal fragmentation coil to make up the weight. The fuze well will have a hole in the bottom when the extra coil is used.

The grenade is painted a deep red colour and the fuze mechanism is coated with a purple Lacquer. There may be a stamped manufacturers marking found on the body.

Throwing dummy

This is a solid aluminum casting with a steel rod running through the centre. The aluminum is cast around the steel rod then the grenade body formed on a lathe. The steel rod protrudes at the top to represent the igniter mechanism. A heavy gauge lever is welded to the top of the steel rod. Total weight is about 406 gm. The grenade is painted light blue.

RGD 5

The grenade is virtually identical to the Russian manufactured grenade.
The body is a two-piece sheet metal outer casing with a two piece presegmented fragmentation liner. The body is seamed together in the centre with a prominent seam. There are 3 "dimples" located both above and below the centre joint. The dimples retain the fragmentation liners in place while the grenade is being crimped together. The top of the body has an internally threaded metal liner for the igniter mechanism inserted through a hole in the top. A crimped joint at the top of the grenade locks the liner in place in the upper half of the body. A UZRGM fuze mechanism screws into the top of the grenade.

RGD 5

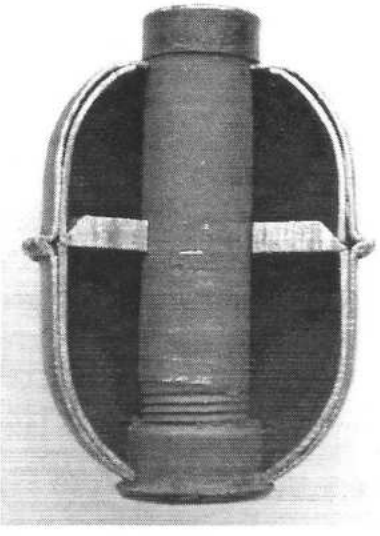
TYPE- Fragmentation
WEIGHT- 310 gm
DIAMETER- 51.5mm, 57 at the joint
LENGTH- Total 113-115 mm
Body 73-74 mm
FILLING- 110 gm TNT
IGNITER- UZRGM
FUZE DELAY- 3.2-4.2 sec.
EFFECTIVE RADIUS- 5 metres

RGD 5 with transit plug
Photo- Dimitar Mitev

The body is painted dark green with

markings in black. Markings give the designation and a manufacturing plant number. Bulgarian grenades typically have two broken circles around the manufacturing plant number.

Grenades are packed 20 grenade bodies with transit plugs and 2 sealed tins containing 10 UZRGM fuzes each, per wooden packing crate.

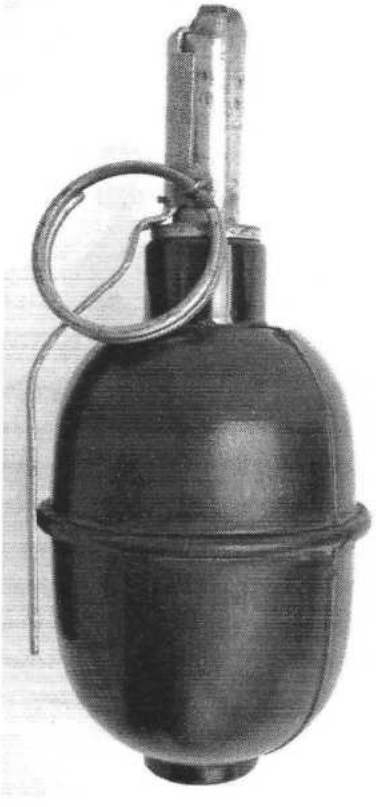


Early Version RGD 5IM
Photos - Dimitar Mitev

RGD 5 IM

There are two versions of this grenade; the first is a metal version. This consists of a normal RGD 5 body and internal liners. There are large holes in both the bottom and top of the body. When the body is put together there is a heavy steel disc mounted in the centre to provide weight held in place at the centre joint of the body. A steel tube, with the top end of larger diameter and threaded internally runs through the body from the top and through a hole in the disc to a slightly larger hole in the bottom of the body. The bottom end of the tube is externally threaded to accept a nut which when screwed on fits up into the body through the larger bottom hole. A flange on the nut fits tightly against the body when fully screwed in. Two punch marks in the flange prevent the nut from unscrewing. An UZRGM-74IM fuze mechanism screws into the top of the centre tube.

The grenade body is initially painted green and after assembly is over painted black to denote a practice grenade. Markings in white give the designation of the grenade.



Late Version RGD 5IM
Photo - Dimitar Mitev

The later version of the grenade has a solid rubber body with a steel chamber running centrally through the body. The top end of the chamber is threaded to accept the fuze mechanism and practice charge. The bottom end is open to allow the gases from the exploding charge to escape. The fuze mechanism is the UZRGM-74IM mechanism that incorporates a practice charge.

When the practice charge is fired, the gases and smoke from the detonation escape through the open bottom of the steel chamber.

The grenade body is black rubber normally with painted white markings giving the designation of the grenade. Through use the markings may wear off leaving only the black body.

RGD 5IM

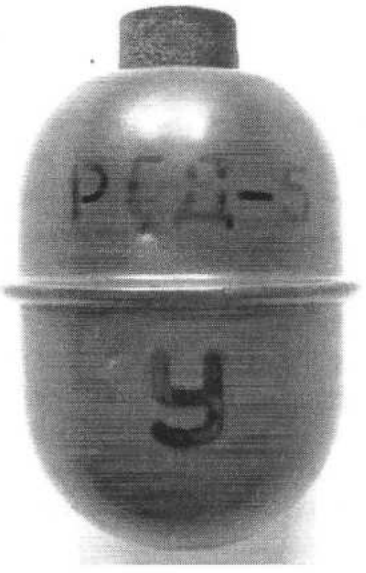
TYPE- Practice
WEIGHT- 268-270 gm
DIAMETER- 51.5 mm
LENGTH- Body 80 mm
IGNITER- UZRGM-74IM
FUZE DELAY- 3.2-4.2 sec.

RGD 5U

The body is constructed the same as the live version but has an inert filling in place of the explosive charge. The fuze mechanism

is a drill UZRGM with either a rounded or squared safety lever.

The body is painted red with black markings. Markings give the designation and "U" indicating a drill grenade. The grenades are supplied in wooden boxes containing 20 grenades and 20 drill fuzes.



RGD 5U
Photo- Dimitar Mitev

RGD 5 Instructional

This is a sectioned grenade used in classroom instruction. The grenade is constructed the same as a live grenade but the body is filled with Gypsum to represent the explosive filling. About ¼ of the body is cut out to show the internal construction of the grenade. In difference to most other Warsaw Pact countries, the igniter mechanism is also sectioned.

RGO 78

The RGO 78 is similar in appearance to the standard RGD 5. The body is the same shape but has ridges stamped into the body on both the top and bottom halves.

The body is made in two parts, the lower half and the upper half that has a hole in the top. The two halves of the body are joined in the centre by a prominent seam. The outer sheet metal body encloses a two piece plastic matrix containing about 900 steel balls of 4 mm diameter, that provide the fragmentation effects. The threading to hold the igniter mechanism is formed in the upper portion of the plastic matrix. The explosive bursting charge consists of 2 pressed sub charges, upper and lower. The design of the charge eliminates the requirement of a sealed fuze well which has been eliminated in this grenade. It can be fitted with either the UZRGM or DVM fuze mechanism; the DVM fuze is the standard.

RGO 78 with UZRGM Fuze

The body is painted olive green with black markings. Markings give the designation, manufacturers factory code, and date of manufacture. In addition, on both top and bottom halves, ridges are formed into the body. The ridges are an identification feature so the grenade can be easily identified at night.

Grenades are packed 20 per box with transit plugs in. Igniters are packed 10 per sealed metal container, 2 containers per box.

RGO 78 with DVM Fuze
Photo- Dimitar Mitev

RGO 78IM

The body, weighing 410-415 grams, is made of vulcanized rubber with a steel pipe running through the centre forming a

chamber. The chamber protrudes from both top and bottom of the body and is threaded at the top end to fit the UZRGM-74-IM practice fuze mechanism. It is open at the bottom to release the gases and smoke from the exploding practice charge.

The body is black with markings painted in white. The markings give the designation of the grenade on one side of the body, the lot number on the other. Embossed ridges on the practice grenade represent the ridges present on the live grenade.

RGO 78

TYPE- Fragmentation
WEIGHT- 445-450 gm
DIAMETER- 54mm, 61 mm at the seam
LENGTH- 78 mm body only
94 mm total
FILLING- 85 gm TNT
IGNITER- UZRGM or DVM
FUZE DELAY- 3.2 – 4.0 sec.
EFFECTIVE RADIUS- 20 metres

RGO 78IM
Photo- Dimitar Mitev

The grenade is reusable by replacing the UZRGM 74-IM practice fuze mechanism.

This version is likely now out of service being replaced by the RGO-IM.

RGO 78IM

TYPE- Practice
WEIGHT- 410-415 gm body only
DIAMETER- 54mm, 61 mm at the seam
LENGTH- 78 mm body only
94 mm total
IGNITER- UZRGM 74-IM
FUZE DELAY- 3.2 – 4.0 sec.

RGO-IM

The body is constructed of vulcanized rubber around a central steel chamber. The chamber is threaded at the top end to fit the DVM-IM practice fuze mechanism. The chamber on this version does not protrude from top or bottom of the grenade so it more closely resembles the live grenade. There are extra weights welded to the outside of the chamber before the body is attached to more closely match the weight of the live grenade.

The body is black with embossed markings giving the designation RGO-IM in Cyrillic. Embossed ridges on the practice grenade represent the ridges present on the live grenade.

The grenade is reusable by replacing the DVM practice fuze mechanism.

RGO 78U

This is the drill version of the RGO 78 grenade. The grenade is constructed the same as a live grenade but has inert components. It is used for classroom instruction in the mechanism and use of the grenade.
The grenade contains both a fragmentation matrix and inert filling representing the explosive charge. Both the fragmentation matrix and filling are made in two halves the same as a live grenade. The filling representing the explosive charge is not always present. The fragmentation matrix is plastic with between 850 and 1000 steel balls suspended in it.

The grenade is painted green with markings in black. Markings give the designation, manufacturing factory, and date of manufacture. There is a large "Y" painted on the bottom of the body indicating a drill grenade. In addition on newer manufacture "IN" for Inert is stenciled after the factory marking.

RGO IM

RGO 78U

TYPE- Drill
WEIGHT- 445-450 gm, 340 gm without charge
DIAMETER- 54 mm, 61 mm at the seam
LENGTH- 78 mm body only
IGNITER- UZRGM or DVM drill

RGO 78 Instructional

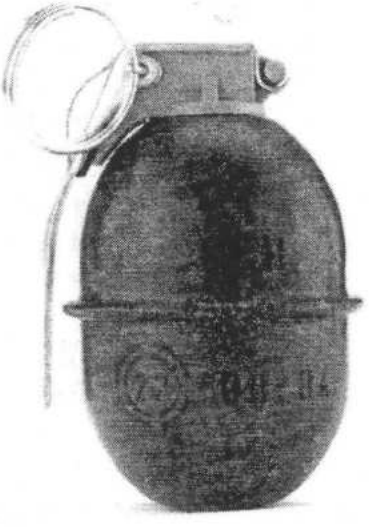
In keeping with previous practices, it is likely that sectioned grenades are also manufactured.

RGN 86

This is the latest officially adopted grenade known of Bulgarian manufacture. It is a controlled fragmentation type grenade having a small effective range but within that range is very effective. It is classed as an offensive grenade due to the short effective range of the fragments.

The body is constructed in two parts out of sheet steel. The lower section is simply bowl shaped with a flattened bottom; the upper section is also bowl shaped but has a hole in top. The body is lined with a two-piece plastic matrix filled with small cylindrical shaped aluminum pieces to provide fragmentation effects. The threads to accept the igniter mechanism are formed in the upper section of the fragmentation matrix. The explosive bursting charge is likely made in two pressed sub charges and is fitted into the void inside the fragmentation matrix. The body is crimped together at the centre making a prominent seam. A DVM fuze mechanism screws into the top. The light fragments not being aerodynamic, reduce the range the fragments will fly providing the controlled fragmentation effect

The body is painted dark green with markings in black. The fuze mechanism is made of gray, white, or lighter green plastic with an unpainted safety lever.



RGN 86

RGN-IM

RGN 86

TYPE- Offensive
WEIGHT- 260-265 gm
DIAMETER- 61mm at the seam
LENGTH- 92mm total
76mm body
FILLING- 57 gm A-IX-1(RDX+Wax)
IGNITER- DVM
FUZE DELAY- 3.2 – 4.2 sec.
EFFECTIVE RADIUS- 5 metres

This is a practice version of the RGN86. The body is made of plastic in two pieces with an inert filling. The upper body is joined to the lower body at the center band with a cardboard disc separating the two halves of the inert filling. The filling gives the grenade a similar weight to a live grenade. The upper portion of the body is threaded to accept the practice fuze mechanism.

The grenade is black plastic with embossed markings on the upper half of the body giving the designation of the grenade. Markings are in Cyrillic lettering.

The practice DVM-IM fuze mechanism has a larger thread than a live fuze preventing them being interchanged. The fuze mechanism and practice charge are made as a single unit. This grenade is not reusable, once fired it is not reloaded. When the practice charge is fired, the expanding gases blow the grenade body into two parts scattering the inert filling.

RGN-IM

TYPE- Practice
WEIGHT- 270 gm
DIAMETER-60 mm
LENGTH-94 mm
FILLING- 180 gm Barite
IGNITER- DVM-IM
FUZE DELAY- 3.2 – 4.2 sec.

RGN 86U

It is likely, in keeping with Bulgarian practice, that a training version of this

grenade exists but so far no confirmed information has been found. It is assumed it would be constructed in a similar manner to the RGO 78U.

RGN-IM

RGN Instructional

It is also likely that sectioned RGN have been produced but no confirmed information has been received.

RDG-2

This grenade was developed in Russia and subsequently adopted by all Warsaw Pact countries. The grenade is designed to produce a smoke screen to cover the movements of troops in the open. In Bulgaria, prior to 1989, the grenades were produced in the "State Match Factory" in Kostenec. Since privatization in 1989 they have been produced in the Kostenec Branch of Terem.

The body is made of waxed cardboard in a cylindrical shape. The filling is a fast burning smoke mixture, A-13. The filling is composed of 42% Potassium Chlorate, 15% raw Anthrazene, and 43% Ammonium Chloride. The bottom is closed by a cardboard end cap with a tape protruding from underneath. The cap covers 4 emission holes in the end, a central 9.5 mm hole with three 5 mm holes surrounding it. The top end is closed in the same manner but has a string (older models have a tape) protruding from underneath the end cap. The string is attached to a doughnut shaped striker board. A cardboard tube runs through the body from the bottom central hole about half way until it meets the igniter. The top end of the igniter has a match head ignition end covered by paper. The doughnut shaped striker fits over the match head, prevented from touching it by the paper. The top end of the grenade also has emission holes in the same manner as the bottom. The top is closed by an end cap that protects and waterproofs the igniter. The grenade is a natural cardboard colour with the entire outside coated in lacquer. The ends are then coated with wax to waterproof the grenade. No other markings are noted.

For use, first pull on the tape protruding from the bottom of the grenade, this will pull off the end cap exposing an emission hole. Second pull the string on the top of the grenade and remove the cap. The string is attached to the striker board. Remove the striker board and retain it. Remove the protective paper covering the match head of the igniter. Using the striker, draw it across the match head and ensure it ignites. Throw the grenade. After a delay of about 10 seconds, smoke will begin to emit. When ignited, the grenade produces large volumes of white smoke that is emitted from both ends of the grenade. When ignited it reaches its maximum smoke production in less than 10 seconds and will produce smoke for 50 to 90 seconds.

RDG 2ch

This grenade is constructed and used in exactly the same manner as the RDG 2 except it produces black smoke. The filling is a 50/50 mixture of Potassium Chlorate/Anthrazene and when burning it has an open flame unlike the RDG 2. These grenades are often used in exercises to simulate burning tanks, vehicles, or buildings.

RDG-2

TYPE- Smoke, Screening
WEIGHT- 400-500 gm.
DIAMETER- 51 mm
LENGTH- 210 mm
IGNITER- Friction
FILLING- A-13 Smoke Compound 330-370 gm
FUZE DELAY- 5-10 sec.

Coloured Smoke

In 2000, Terem developed coloured smoke grenades based on the RDG 2 white smoke grenade. They are produced in yellow, green, red, and blue.

Specifications, description, and use are as for the RDG 2.

RDG 2h

This grenade is similar to the RDG 2 but instead of the match head igniter, uses a pull friction igniter. The weight of the grenade is higher due to the filling weighing 450 grams. The filling is a slow burning smoke mixture similar to HC. The filling consists of 65-70 % Hexachlorethane, 20-25% Iron Oxide, and 6-10% Aluminum powder. When the igniter is pulled, it first ignites a priming mixture to get the slower burning filling going. This grenade produces a greyish coloured smoke.

RDG-3

This is an orange smoke version of the RDG 2. Designed for signaling rather than to provide a smoke screen. They are also used for accident warning and target designation. It is manufactured only in orange. The grenades are produced in the Kostenec Branch of Terem.

RDG-2, Photo- Dimitar Mitev

The body is made of waxed cardboard in a cylindrical shape. The bottom is closed by a cardboard end cap with a tape protruding from below the cap. The cap covers 4 emission holes in the end, a central 9.5 mm hole with three 5 mm holes surrounding it. The top end is closed in the same manner but has a string protruding from underneath the end cap. The string is attached to a doughnut shaped striker board. A cardboard tube runs through the body from the bottom central hole about half way until it meets the igniter. The top end of the igniter has a match head ignition end covered by paper. The doughnut shaped striker fits over the match head, prevented from touching it by the paper. The top end of the grenade also has emission holes in the same manner as the bottom. An end cap closes the top protecting and waterproofing the igniter.

The grenade is a natural cardboard colour with a slightly orange colour. The entire grenade is lacquered and the ends coated with wax to waterproof the grenade.

RDG-3

TYPE- Smoke, Signal
WEIGHT- 430 gm.
DIAMETER- 51-52 mm
LENGTH- 210 mm
IGNITER- Match Head
FILLING- Orange Smoke Compound 230-300 gm
FUZE DELAY- 10-15 sec.

For use, first pull on the tape protruding from the bottom of the grenade, this will pull off the end cap exposing an emission hole. Secondly pull the string on the top of the grenade and remove the cap. The string is attached to the striker board. Remove the striker board and retain it. Remove the protective paper covering the match head of the igniter. Using the striker, draw it across the match head and ensure it ignites. Throw the grenade. After a delay of about 10 seconds, smoke will begin to emit. When ignited, the grenade produces large volumes of orange smoke that is emitted from both ends of the grenade. When

ignited it reaches its maximum smoke production in 15 seconds and will produce smoke for 60-100 seconds.

Uch ODG

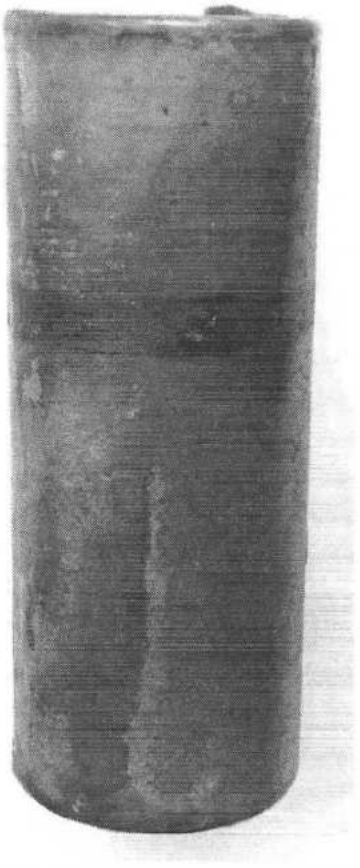
This grenade is used in field training to simulate a chemical attack. They were originally produced in the "State Match Factory" in Kostenec. After privatization of the factory, Terem continued to produce them to the early 1990's when production was halted.

The grenade has a cardboard body, lacquered both inside and out. The smoke compound is compressed directly into the body leaving a central hole through the compound. The bottom has 4 emission holes in the end, a central 9.5 mm hole with three 5 mm holes surrounding it. A cardboard tube runs through the body from the bottom central hole. The bottom is closed by a cardboard end cap with a tape protruding from underneath. An igniter with match head is fitted from the top into the central hole. The top is also closed by an end cap with protruding tape. The top tape is attached to a doughnut shaped striker board. The top end of the igniter has a match head ignition end covered by paper. The doughnut shaped striker fits over the match head, prevented from touching it by the paper. The top end of the grenade also has emission holes in the same manner as the bottom. The filling is a mixture of powdered Chloracetophenone (30%), Perchlorvinilic tar (30%) and Potassium Nitrate (40%).

Uch ODG

TYPE- Training, Lachrymatory
WEIGHT- 250-270 gm
DIAMETER- 51-52 mm
LENGTH- 131-132 mm
FILLING- 180-210gm UBNOV-2
IGNITER- Friction

The body is unpainted. There is a blue band painted around the body closest to the ignition end.



Uch ODG
Photo- Dimitar Mitev

When ignited it takes about 20 seconds for the grenade to actively smoke after which the grenade will produce a lachrymatory smoke for 1-3 minutes that can cover an area about 550 metres long.

GHD-1

This defensive grenade is manufactured by Arsenal BG. It is unknown if this grenade has been adopted by Bulgarian forces. This may be an offering by Arsenal BG designed for foreign sales only.

The body of the grenade is olive green plastic. The outside of the body is smooth and has several grooves in the bottom of the body to aid in identification at night. The body contains an explosive charge surrounded by round fragments. The fuze mechanism screws into the top of the grenade. The fuze may be either the standard DVM or the newer FD-1. The explosive charge and the round shape of the fragments combine to give a lethal radius of 20 metres.

GHD-1

TYPE- Fragmentation
WEIGHT- 480 gm
DIAMETER- 56 mm
LENGTH- Total 95 mm
FILLING- 75 gm A-IX-1
IGNITER- DVM or FD-1
FUZE DELAY- 3.2-4.2 sec.
EFFECTIVE RADIUS- 20 metres

Markings include the designation, lot number, manufacturer and filling in black on the side of the body.

GHD-2

This defensive grenade is manufactured by Arsenal BG. It is unknown if this grenade has been adopted by Bulgarian forces. This may be an offering by Arsenal BG designed for foreign sales only.

GHD-2

TYPE- Fragmentation
WEIGHT- 440 gm
DIAMETER- 58 mm
LENGTH- Total 95 mm
FILLING- 80 gm A-IX-1
IGNITER- DVM or FD-1
FUZE DELAY- 3.2-4.2 sec.
EFFECTIVE RADIUS- 18 metres

The body of the grenade is olive green plastic. The outside of the body has ribs molded on to assist in gripping the grenade and as a method of identification. The designation is molded onto the side of the body. The body contains an explosive charge surrounded by round fragments. The fuze mechanism screws into the top of the grenade. The fuze may be either the standard DVM or the newer FD-1.

The explosive charge and the round shape of the fragments combine to give the grenade an effective lethal radius of 18 metres.

Top- GHD-1
Bottom- GHD-2
Photos- Arsenal BG

GHO-1

GHO-1
Photo- Arsenal BG

This offensive grenade is manufactured by Arsenal BG. It is unknown if this grenade has been adopted by Bulgarian forces. This may be an offering by Arsenal BG designed for foreign sales only.

The body of the grenade is olive green plastic. The outside of the body is smooth and has the designation molded onto the side of the body. The body contains a small explosive charge surrounded by cylindrical fragments. The fuze mechanism screws into the top of the grenade. The fuze may be either the standard DVM or the newer FD-1.

The small explosive charge and the cylindrical shape of the fragments combined serve to limit the range of the fragments. The lethal radius of the grenade is 5 metres.

GHO-1

TYPE- Offensive
WEIGHT- 280 gm
DIAMETER- 56 mm
LENGTH- Total 95 mm
FILLING- 58 gm A-IX-1
IGNITER- DVM or FD-1
FUZE DELAY- 3.2-4.2 sec.
EFFECTIVE RADIUS- 5 metres

Czechoslovakian Grenades

On 28 October 1918 the Czechoslovakian Republic was formed from part of the Austro-Hungarian Empire. Initially Czech forces used stocks of grenades left over from WWI, both Austro Hungarian and German models.

Shortly after the republic was formed development of indigenous grenades began. In 1919 the "Janecek" series was adopted. In 1920 the vz20 grenade was developed, both types being produced in the Ammunition Works at Skoda. The vz21 is an adaptation of the "Janecek" ignition system and was adopted in 1921. The "Janecek" and vz20 seem to have been replaced in service quite quickly leaving the vz21 in service until adoption of the OUG vz 34. The OUG vz 34 served from about 1934, through WWII until adoption of the RG-4 in the 1950's. Along with the OUG vz 34 a defensive version, ORG vz 38, was adopted in 1938. The defensive version has a thicker casing to produce more and heavier fragments. Another grenade appears to have been adopted at about the same time, this was the OCRG vz 38. It is not well known so the assumption must be that it saw little service although it is described in a post war manual.

In 1938 Germany occupied parts of the border regions and Hungary occupied some territories in southern Slovakia. Czechoslovakia ceased to exist in 1939, the Germans occupied the remaining Bohemian lands and Slovakia was forced to declare independence. The newly created Slovakia became an ally of Germany and fought on the Russian front until the summer of 1944 when Slovakian forces staged an uprising against the government. German forces crushed the uprising after several months of fighting. Slovakian forces would likely have been supplied with German grenades during this period as well as using the Czech grenades.

At the end of WWII Czechoslovakia was reestablished. In 1948 the Communist Party of Czechoslovakia seized

Experimental Anti Tank Grenade, note the same safety mechanism as used in the RG 4
Photo- Zdenek Horak

power and the country came under Soviet influence. Russian grenades were taken into Czech service along with existing Czech grenades. The Russian models included the RDG 33, RG 42, F1, RPG 40, RPG43, and later the RKG series of antitank grenades. Some Russian models were eventually produced in Czechoslovakia.

With the adoption of the RG 4 in the 1950's it appears that little development of new grenades took place until the 1980's. Development in the 1980's culminated with the adoption of the URG86.

Czechoslovakia became a democratic country again with the fall of the Soviet Union. In 1992 the federal parliament decided to split the country into the Czech Republic and Slovakia. At this point I believe both countries continue to use the URG86 and likely any Soviet type grenades remaining in inventory.

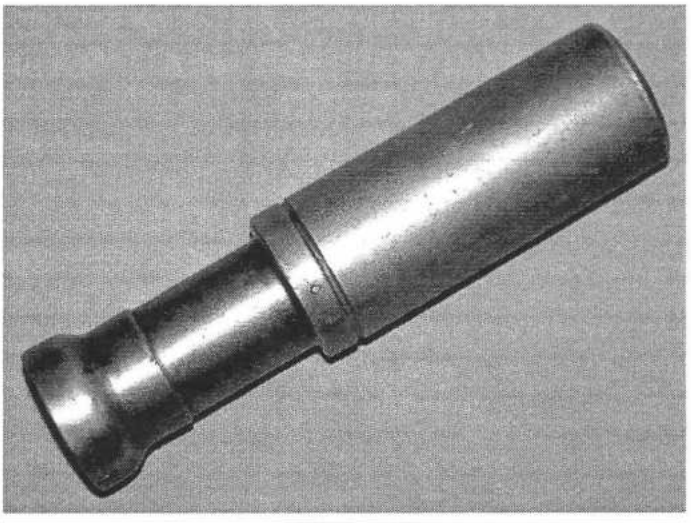
Series of photos showing the transistion from the OUG vz 34 (1st photo) to the RG 4 (last photo)
Photos- Zdenek Horak

Rucni Granat "Janecek"

This is actually a series of grenades comprising Offensive, Defensive, and Training grenades all using the same basic system. Introduced in about 1919 they did not remain in service long.

Utocny Ofensivni Granat

This is the Offensive version of the "Janecek system" The body is made of sheet steel in a cylindrical form and has a flattened top. The explosive head is larger in diameter than the handle. The handle, also made of sheet metal, contains the igniter mechanism. A belled out shield is attached to the bottom of the handle.



Janecek Offensive Grenade
Photo- Zdenek Horak

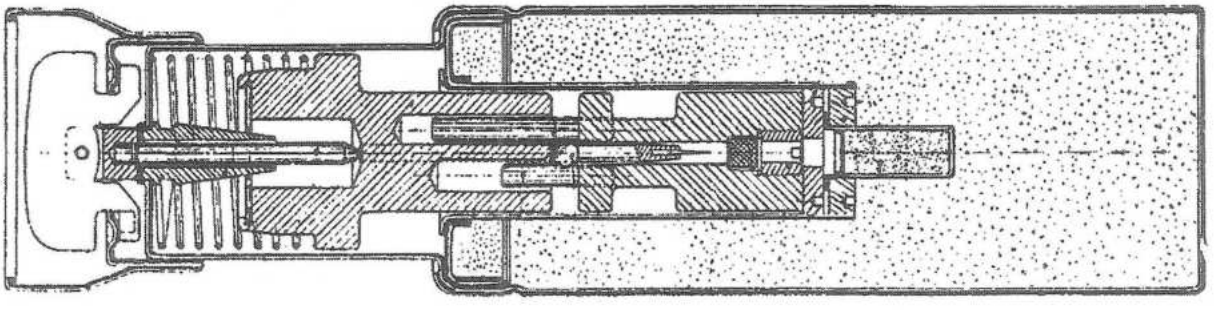
Internally there is a deep detonator well formed in the head that opens at the top of the handle. The detonator is located in the centre of the well at its bottom. A primer holder with a hole drilled completely through is fitted into the detonator well. The primer is attached at the bottom end of the hole with the remainder of the hole acting as a striker channel.

Granat Utocny

TYPE- Offensive
WEIGHT- 620 gm
DIAMETER- 42 mm
LENGTH- 173 mm
FILLING- Trotyl 80 gm.
IGNITER- Impact
EFFECTIVE RADIUS- 10-15 metres

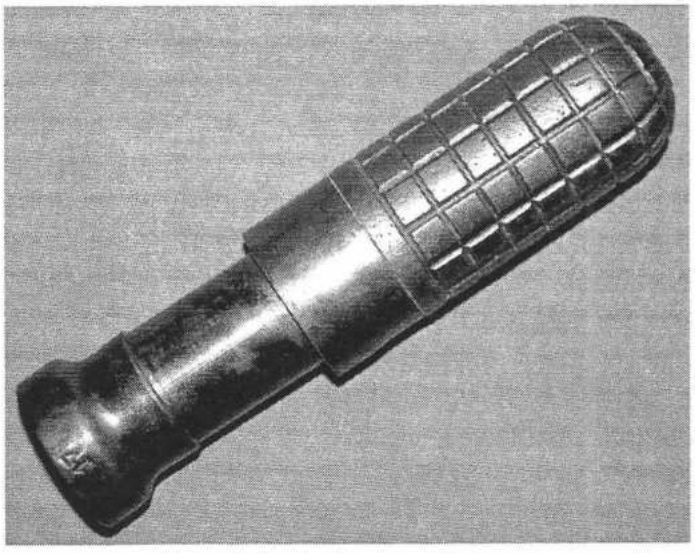
The top end of the primer holder is formed with a long side and short side. A weight is fitted into the back end of the primer holder and has the striker attached to it with the striker in the central hole. A safety ball fits into a chamber formed in the primer holder preventing the forward travel of the weight keeping the striker away from the detonator. The weight has a spring attached to the back end that is also attached to the bottom of the handle. The back end of the handle is formed with slots in the end to hold a key. When the grenade is assembled the key pushes forward on the weight forcing the weight against the safety ball to hold it in place. The shield at the bottom of the handle protects the key in its locked position.

For use, the key is removed by turning it to the left. When the key is removed and the grenade thrown so that it rotates end over end, centrifugal force causes the weight to pull out of the primer holder compressing the spring and allowing the safety ball to fall clear. At this point the grenade is armed and is held safe by centrifugal force.



When the grenade impacts, the centrifugal forces stop and the weight is driven forward by the spring reasserting itself. This also forces the striker down the striker channel until it hits the primer. The primer flashes into the detonator causing it to fire and detonate the main filling of the grenade.

It should be noted that it is important that the grenade be thrown so that it rotates end over end as it flies through the air. Without the rotation the grenade will not function properly.



Janecek Defensive Grenade
Photo- Zdenek Horak

Obranny defensivni Granat

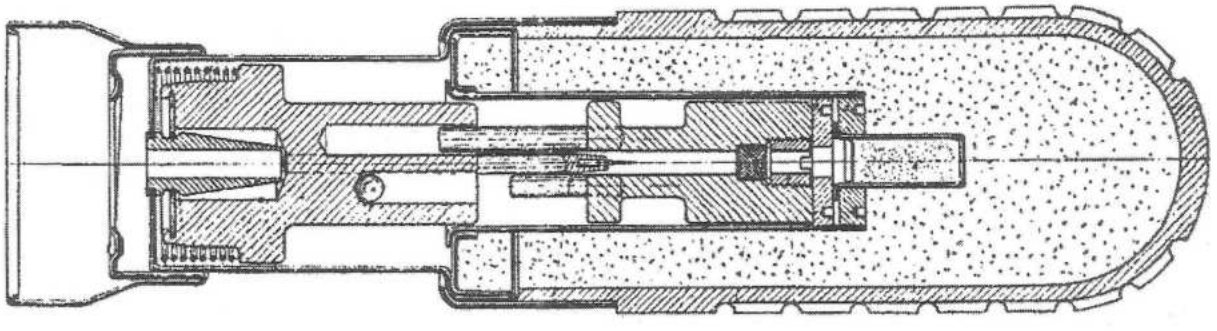
This is the defensive version of the "Janecek" system. The head of the grenade is made of a heavier material, most likely cast iron, in a cylindrical shape with a rounded top. The head is partially pre segmented to improve fragmentation. The handle is made of sheet steel.

Internally there is a deep detonator well formed in the head that opens at the top of the handle. The detonator is located in the centre of the well at its bottom. A primer holder with a hole drilled completely through is fitted into the detonator well. The primer is attached at the bottom end of the hole with the remainder of the hole acting as a striker channel. The top end of the primer holder is formed with a long side and short side. A weight is fitted into the back end of the primer holder and has the striker attached to it with the striker in the central hole. A safety ball fits into a chamber formed in the primer holder preventing the forward travel of the weight keeping the striker away from the detonator. The weight has a spring attached to the back end that is also attached to the bottom of the handle. The back end of the handle is formed with slots in the end to hold a key. When the grenade is assembled the key pushes forward on the weight forcing the weight against the safety ball to hold it in place. The shield at the bottom of the handle protects the key in its locked position.

Granat Obranny

TYPE- Defensive
WEIGHT- 615 gm
DIAMETER- 42 mm
LENGTH- 173 mm
FILLING- Trotyl 80 gm.
IGNITER- Impact
EFFECTIVE RADIUS- 30 metres

For use, the key is removed by turning it to the left. When the key is removed and the grenade thrown so that it rotates end over end, centrifugal force



causes the weight to pull out of the primer holder compressing the spring and allowing the safety ball to fall clear. At this point the grenade is armed and is held safe by centrifugal force. When the grenade impacts, the centrifugal forces stop and the weight is driven forward by the spring reasserting itself. This also forces the striker down the striker channel until it hits the primer. The primer flashes into the detonator causing it to fire and detonate the main filling of the grenade.

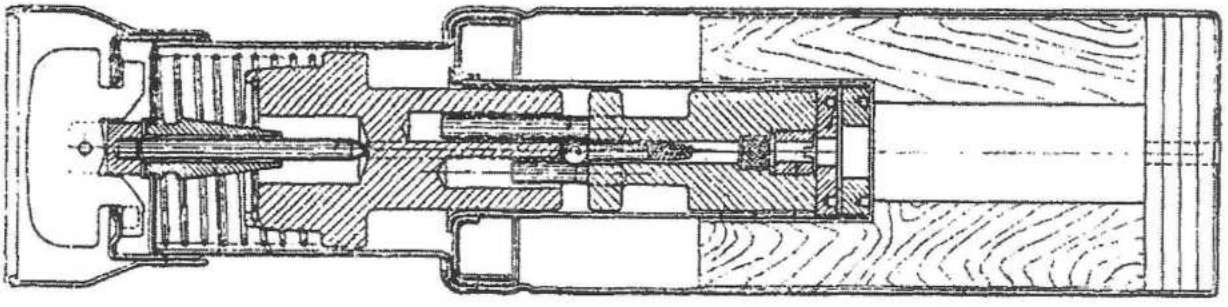
It should be noted that it is important that the grenade be thrown so that it rotates end over end as it flies through the air. Without the rotation the grenade will not function properly.

Cvicny Granat

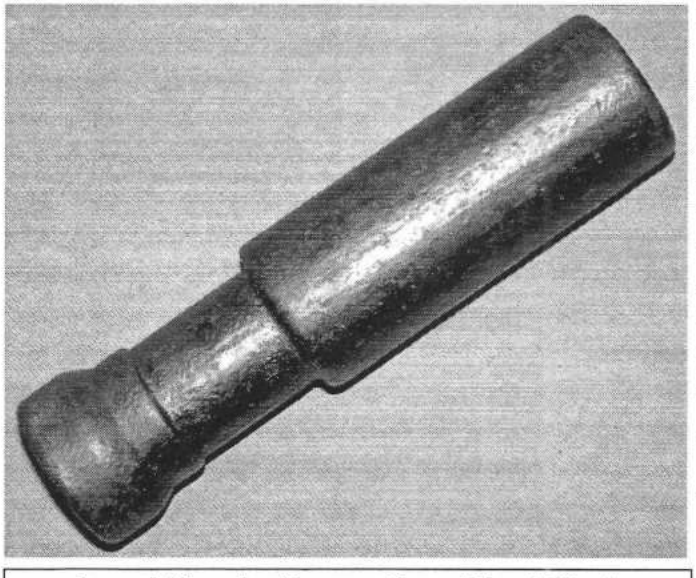
Granat Cvicny

TYPE- Practice
WEIGHT- 600 gm
DIAMETER- 42 mm
LENGTH- 173 mm

This is the practice version of the "Janecek" system. It is made to represent the offensive version of the grenade. In place of the explosive filling the head is filled by a wooden cylinder with weights in the top end. The weights serve to give the grenade a weight similar to the live grenades and also give it the same throwing properties as a live grenade. It could be fitted with a small spotting charge and the igniter mechanism reset so it could be used again. There is a hole through the wooden cylinder and the head of the grenade to allow gases and smoke from the practice charge to escape.



Granat vz. Janecek



Janecek Throwing Dummy Photo- Zdenek Horak

Granat vz. Janecek

TYPE- Throwing dummy
WEIGHT- 620 gm
DIAMETER- 42 mm
LENGTH- 175 mm

This is a training grenade used to practice troops in throwing the grenade properly before moving on to practice or live grenades. Also used for ongoing practice to improve accuracy and remain current in throwing. Ensuring the troops throw the grenade properly, end over end, it important as live grenades that are not thrown properly will fail to explode.

The body is a solid piece of cast iron made to accurately represent the offensive version. The grenade is normally painted black.

Rucni Granat vz 20

This grenade was introduced in about 1920.

Rucni Granat vz 20

TYPE- Fragmentation
WEIGHT- 400 gm
DIAMETER- 46 mm
LENGTH- 73 mm
FILLING- 45 gm TNT
IGNITER- Impact
EFFECTIVE RADIUS- 30 metres

The body is cast iron and has a threaded hole in the top to fit the igniter mechanism. The body is grooved on the outside to give a better gripping surface. The impact igniter screws into the threaded hole. A sheet metal cap covers the igniter. The inside top of the cap has packing material glued on so that when the cap is in place is presses down on the igniter mechanism keeping it rigid. The safety pin fits through the sheet metal cap and igniter mechanism housing.

For use, remove the safety pin, leaving the cap in place. When the grenade is thrown the cap falls away allowing the igniter mechanism to arm. Upon impact the igniter functions causing the main filling to detonate and burst the body of the grenade.

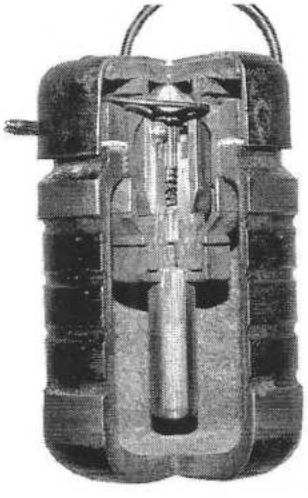
Rucni Granat Cvicny vz 20

This is the practice version of the vz20 grenade. It is constructed in basically the same manner but the outside of the body is not grooved. It is unknown if it could be fitted with a practice charge although it seems likely.

Rucni Granat Cvicny vz 20

TYPE- Training
WEIGHT- 360 gm
DIAMETER- 47 mm
LENGTH- 75 mm

The grenade is constructed so that the same actions required of the live grenade are also required for th practice grenade.



Rucni Granat vz 20 Photos- Zdenek Horak
Left photo is live version, Centre photo is instructional model, Right photo is practice version.

Utocny Vejcity Granat vz 21

The vz21 was in Czech service from about 1921 until adoption of the OUG vz 34 although manufacture ended in 1926. It was a dual-purpose grenade that could be used by hand or fired from a vz23 discharger cup as a rifle grenade.

The body is made of thin sheet steel in an elongated egg shape. The body is formed so that there is a central well running the length of the grenade from the top. The space between the outer walls of the body and the central

vz 21 Offensive
Photo- Zdenek Horak

Utocny Vejcity Granat vz 21

TYPE- Offensive
WEIGHT- 450 gm
DIAMETER- 50 mm
LENGTH- 110 mm
FILLING- 125 gm
IGNITER- Impact

well are filled with the main explosive filling. A detonator assembly consisting of a detonator and booster are fixed in position at the bottom of the central well. A primer assembly is located directly above the detonator assembly. The primer is fixed in the assembly in the centre. A weight with the striker mounted is located at the top of the well. A distance pin located in a small hole on top of the primer assembly prevents the weighted striker from coming into contact with the primer. A partially compressed spring presses down on the weight keeping the distance pin in position. A key fits in through the top of the grenade locking the pieces in position to ensure safety. The key has a small projection on one side that contacts notches in the top of the grenade ensuring that the key does turn accidentally. The key requires a turn of 180 degrees to remove.

There is a small lug formed near the bottom of the grenade, this is an indexing pin for use with the vz23 discharger cup. This ensures the grenade will rotate end over end after launching.

There are stamped markings on the top of the grenade giving the lot number, year of manufacture and a manufacturers mark.

When the key is removed, the parts are free to move, but are held in position by the partially compressed spring. Once removed, if necessary the key can be replaced to make the grenade safe.

The grenade must be thrown so that it rotates end over end. When the grenade is thrown centrifugal forces cause the weight to move outwards further compressing the spring. When the weight moves out, the distance pin is free to fall out of position in effect arming the grenade. When the grenade impacts, the centrifugal forces stop allowing the spring to reassert itself and push the weight and striker toward the primer. The striker impacts the primer causing it to fire. The primer flashes into the detonator which explodes causing the booster to fire which in turn causes the main explosive filling to detonate.

If the grenade was not thrown with enough force, the spring would not compress enough to allow the distance pin to fall out.

Skolni Vejcity Granat vz 21

Skolni Vejcity Granat vz 21

TYPE- Fragmentation
WEIGHT- 540 gm
DIAMETER- 50 mm
LENGTH- 110 mm
IGNITER- Impact

This grenade is the defensive/ fragmentation version of the vz21. It is also a dual purpose grenade that can be used by hand or fired as a rifle grenade.

vz 21 Defensive
Photo- Zdenek Horak

The body is made of cast iron rather than sheet metal as in the offensive version. The body is heavier and thicker producing

more fragments when the grenade detonates. The basic construction and method of operation is identical to the offensive version.

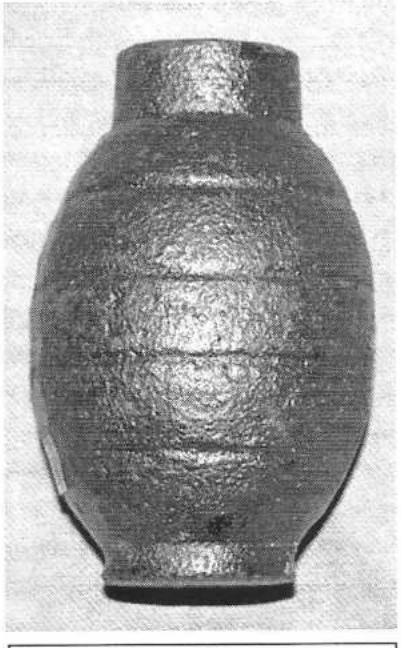
It is easily identified from the offensive version by the pattern cast into the body at top and bottom. The centre of the body is smooth to ensure it functions properly when used as a rifle grenade.

vz 21 Dummy
Photo- Zdenek Horak

Civicny Vejcity Granat vz 21

This is a dummy version of the vz21 made entirely of cast iron. It can be used for throwing practice or firing practice from the discharger cup. It is an accurate cast representation of the fragmentation version. There appears to be several versions, each with some minor differences

The top of the grenade is marked with and impressed "CVICNY".



Unknown
Photo- Zdenek Horak

Unknown

The designation of this grenade is unknown. The grenade dates from about the 1920's but was not adopted as a service grenade. The bodies that were produced however were later used for throwing practice.

The body is cast iron in an egg shape with a flattened bottom and protruding top. The igniter mechanism mounted in the top. There are a number of grooves around the body of the grenade likely designed to give a better gripping surface rather than to assist in breaking the body up.

OUG vz 34

Commonly known as the RG 34, this grenade was adopted by Czechoslovakian forces in 1934 and was used throughout WWII up to the 1950's when the RG 4 was adopted.

The body is made in two parts of thin sheet steel and screw together in the centre by roll threads formed on both parts. The lower half has an inner liner formed to make a cone shaped well in the centre. The space between the liner and outer body is filled with TNT. The upper portion has part of the igniter mechanism and the safety devices. A small housing

OUG vz 34

TYPE- Offensive
WEIGHT- 340 gm
DIAMETER- 53 mm
LENGTH- 74 mm
FILLING- 100 gm TNT
IGNITER- Impact
EFFECTIVE RADIUS- 13 metres

OUG vz 34
Photo- Ed Strazdes

is welded to the side and is part of the safety. There are two sets of slots, one just below and in line with the housing and one at 90 degrees to the first. Assembled into the top is a weighted cap with the firing pin mounted in the centre. The cap has notches cut into the sides to allow the safety bars to fit through. A spring and positioning washer are placed into the cap. The safety device is two part, the first is a safety bar attached to a long spring steel strap with a weight on the end. The second is another safety bar with a slot in the middle attached to the safety ring. The first safety bar is fitted through the slot 90 degrees from the housing. It fits through the body, through the notches in the weighted cap and holds the positioning washer and spring in position. The strap is then wound around the body several times until the weight comes into position below the housing. The second safety bar then fits through the slots under the housing, through the notches in the cap and with the firing pin fitting in its slot. It is pushed in until it fits totally through the body and a pin on the back engages a small hole in the weight on the strap. The ring is then turned until a bar engages into the housing holding the entire mechanism together. The safety bar is then sealed with a thin wire and lead seal.

The detonator assembly is constructed of sheet metal and contains a small explosive charge, detonator, and primer. The top of the assembly is flanged out to a diameter that will fit freely but closely into the weighted cap. The primer and detonator are assembled into the top cap with the explosive charge surrounding it. The detonator assembly fits into the body with the bottom in the coned depression in the bottom and the top fitting into the weighted cap.

The body is screwed together via the roll threads. A thin wire spring is attached in the threading and engages in holes in both ends to ensure the grenade does not unscrew.

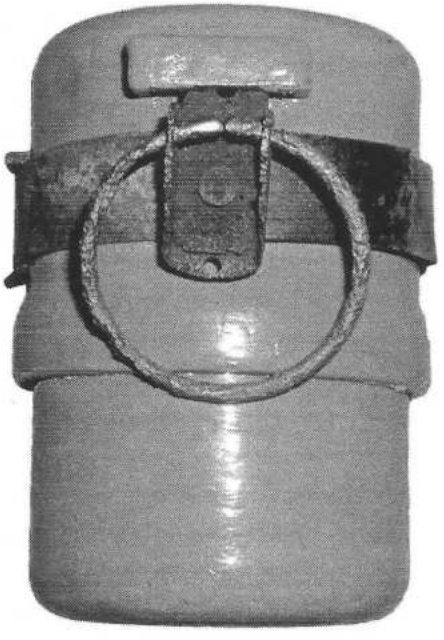
The grenade is painted black with red markings. Most markings are painted on the top of the grenade.

For use, take the grenade in the throwing hand and grasp the safety ring with the other. Turn the safety ring 90 degrees to release it and pull it out of the body while holding the tape with the fingers. When the grenade is thrown the weight on the end of the tape causes the tape to unwind. When fully unwound the final safety bar is pulled out by the combined weight of the tape and weight. This arms the grenade. At this point, the striker is prevented from hitting the primer by the spring and positioning washer. When the grenade strikes the ground the shock of it hitting the ground causes the weighted cap, detonator assembly, or combination of both, to overcome the resistance of the spring allowing the striker to hit the primer. The primer flashes into the detonator causing it to fire initiating the explosive surrounding it. This explosion causes the main filling in the bottom half of the grenade to sympathetically detonate.

SUG vz 34

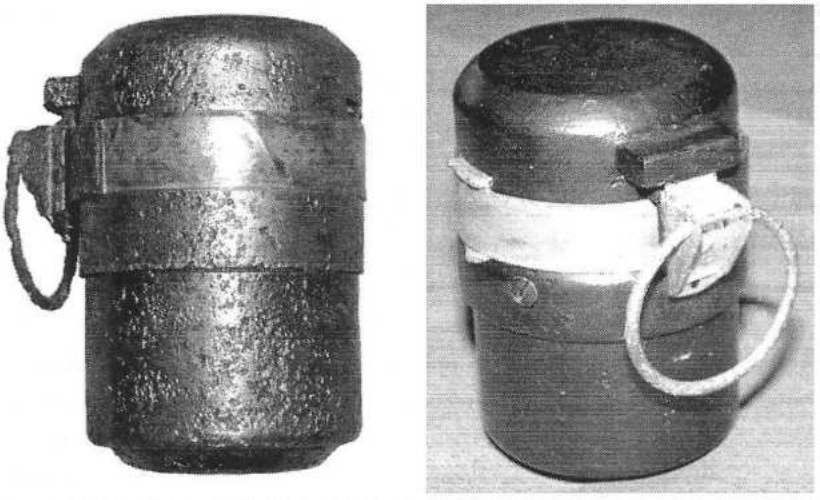
This is a drill version of the OUG vz 34, also usable as the drill version for the ORG vz 38 which it closely resembles.

The body is made of a heavier material than that of the OUG vz 34 to prevent or minimize damage when used for throwing practice. The grenade is constructed so that all actions required of the live grenade can be practiced with this one. The body is painted red to identify it as a drill grenade.



SUG vz 34
Photo- Zdenek Horak

ORG vz 38



ORG vz 38 Photos- Zdenek Horak
The model on the left has the screw thread connection, on the right is the second type slip fit connection with bolts.
Both photos are of ground recovered artifacts.

This grenade was adopted in 1938 and used throughout the Second World War. It was an attempt to make a fragmentation grenade using exactly the same mechanism as used in the OUG vz 34. It was most likely produced in much smaller numbers than the OUG vz 34 as evidenced by the very few that have survived.

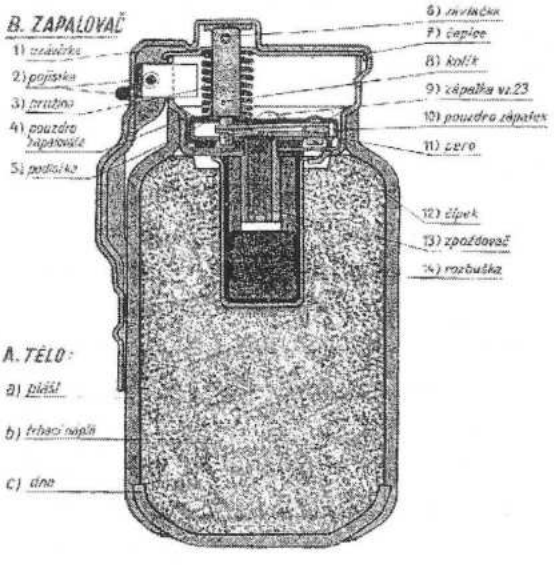
The body is constructed of a heavier gauge material. The heavier body means the roll threading used with the thinner sheet metal was not possible. There are two known versions, the first has both ends of the grenade threaded to screw together, the other is a slip fit with several small screws or bolts locking it together. The mechanism of the grenade is exactly the same as used in the OUG vz 34. Markings are unknown but it is assumed the markings would be similar to that of the OUG vz 34.

Ostry Casovany Rucni Granat vz. 38 (OCRG 38)

OCRG vz 38
Photo - Zdenek Horak

This grenade was originally designed for use in grenade slides in border fortresses (Bunkers). Introduced on April 9, 1938 they were produced by Zbrojovka (Ammunition factory) Jablunka. The initial order was for 900,000 live grenades and 500 practice grenades but the order was never completely filled.

The body is cylindrical and made of steel or iron in two pieces, the main cylinder and a bottom closing plate. The bottom plate is inserted into the body and the bottom edge of the cylinder turned over to overlap and hold it in position. The igniter mechanism is mounted in the top of the body. The igniter mechanism has a flat cylindrical housing. Contained within are two flash primers and a double striker formed of spring wire. A plunger and spring hold the strikers in the cocked position. The spring on the plunger is held in the compressed



position by the safety lever. The safety pin fits through the safety lever and a lug on the housing.

When the grenade is thrown, the safety lever is forced to rotate forward by the plunger and compressed spring. The plunger as it is forced upward by the spring, pulls out of the striker. The striker, once free of the plunger, springs outward to hit the primers. When the primers are hit, they fire and flash into the delay element. The delay element burns down into the detonator that fires and causes the main explosive filling to detonate and burst the body.

The body is painted black. The safety lever has a stamped manufacturers marking.

Early version of the RG-4, note the markings on top and lack of inspection hole.
Photo- Zdenek Horak

Rucni Granat 4 (RG-4)

RG-4
TYPE- Offensive
WEIGHT- 322 gm
DIAMETER- 57 mm Maximum
53 mm main body
LENGTH- 85 mm
FILLING- 110 gm TNT
IGNITER- Impact
FUZE DELAY- none
EFFECTIVE RADIUS- 10 metres

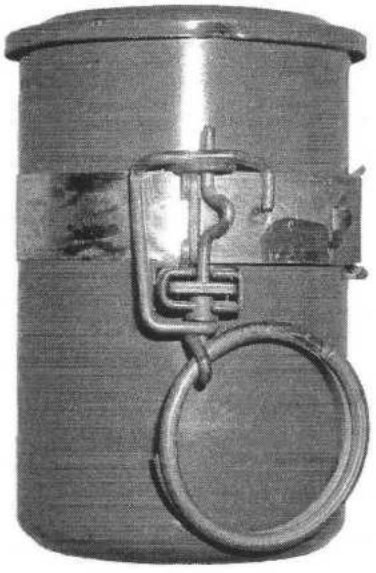
This is an offensive grenade but can be converted to a defensive version with the addition of a fragmentation sleeve. Development of the grenade began in 1945-46. It was adopted for use in the early 1950's to replace the OUG vz 34. It was initially designated RG vz 49 later changed to RG-4.

The body is a sheet metal container with the top seamed on. Lugs are attached to the side of the container to fit the safety pin. The body contains an explosive charge contained in two separate explosive containers. The lower portion of the upper container is reduced in diameter to fit into a well in the bottom section. The upper section has the detonator mounted in the centre of the bottom. The lower section has the striker mounted in the center of the well. A creep spring is inserted in the well and is covered by a disc with hole in the centre to allow the striker to fit through. A safety strip fits through the side of the grenade separating the two containers and blocking the striker. The safety strip is held in place by a safety strap of thin metal with a weight on the end. The safety strap and strip are held in place by the safety pin and fork. The latest manufacture of the grenade has an 4.9 mm inspection hole in the top cover. The fragmentation sleeve is made of a heavier gauge metal and fits over the bottom half of the grenade. There is a square hole in the middle surrounded by a series of round holes. The sides are slit to form gripping fingers. When the fragmentation sleeve is fitted, the fingers formed in the sides grip the grenade sufficiently to hold the sleeve on. The fragmentation sleeve adds 125 grams to the weight of the grenade.

Last version of the RG-4, note the markings and inspection hole.
Photo- Zdenek Horak

Early versions of the grenade are painted black with markings in red. Markings give the filling, lot number, year of manufacture, and manufacturer. Later issues are painted black with markings on the top in white. Markings give the designation, lot number of the grenade, date of manufacture and manufacturer and also the lot number and date of manufacture of the filling itself. The safety strap is a gold

color. The RG-4 was also manufactured for Egypt, these grenades have Arabic markings on the top cover. There are two versions that have been noted, one the body is painted black with white markings, the other the body is painted white with black markings. It seems likely the white painted grenade is the training version.



RG-4 Training
Photo- Zdenek Horak

When the grenade is to be used, the safety pin must first be rotated to release its lock. Once rotated it can be pulled out of the lug. Once free of the lug the safety fork will come out with the rest of the safety pin. The safety strap and weight must be held in place by the hand. When the grenade is thrown, the weight on the end of the safety strap assists in causing it to unwind and pull out the safety strip. Once the safety strip falls away, the grenade is armed. When the grenade strikes the ground the two explosive containers are forced together overcoming the resistance of the creep spring and allowing the striker to hit the detonator. The detonator initiates the main explosive charge.

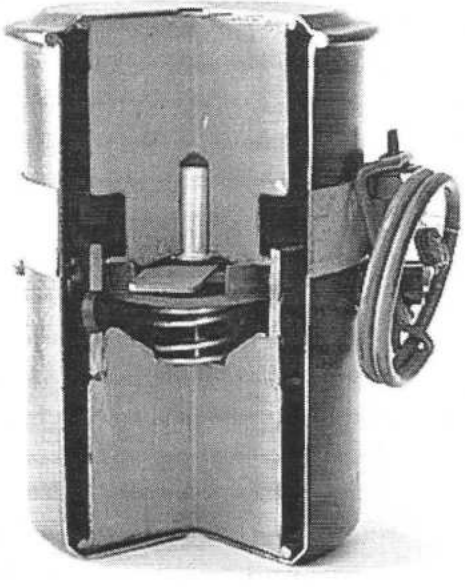
RG- 4 Training

TYPE- Training
WEIGHT- 322 gm
DIAMETER- 57 mm Maximum
53mm main body
LENGTH- 85 mm
FILLING- Inert
IGNITER- Inert

Rucni Granat Skolni 4 (RG- 4)

This is an inert version of the RG 4 used for classroom training.

The grenade is constructed in exactly the same manner as a live grenade except all components are inert. The top cap is removable so the grenade may be broken down into its component parts for instruction. The grenade is painted reddish brown and the safety strap is gold colored.



RG-4 Sectioned
Photo- Zdenek Horak

Rucni Granat Skolni 4 (RG -4)

This is a sectioned training version of the RG 4 and is constructed in the same manner as a live grenade but with inert components. There is a ¼ section cut out of one side to show the internal workings of the grenade.

The grenade is painted in the same colors as a live grenade, black body and a gold safety strap. The inert filling is painted yellow.

Rucni Granat Cvicny 5 (RG Cv 5)

RG Cv 5

TYPE- Practice
WEIGHT- 322 gm
DIAMETER- 57 mm Maximum
52mm main body
LENGTH- 85 mm
FILLING- Spotting charge
IGNITER- Impact

This is the practice version of the RG 4 Offensive grenade. The top of the grenade unscrews so it can be reset and reloaded with a new spotting charge.

The grenade is basically constructed the same as the live version but has a

screw on lid so the spotting charge can be replaced for reuse. The lid has a hole in the top to allow the smoke to escape. Older versions have a 10mm hole; later versions have a 15mm hole. The lower charge container with the striker is only a weighted container without live components. The spotting charge is a replaceable cartridge that takes the place of the upper explosive container and includes a percussion cap to ignite the spotting charge.

RG Cv 58

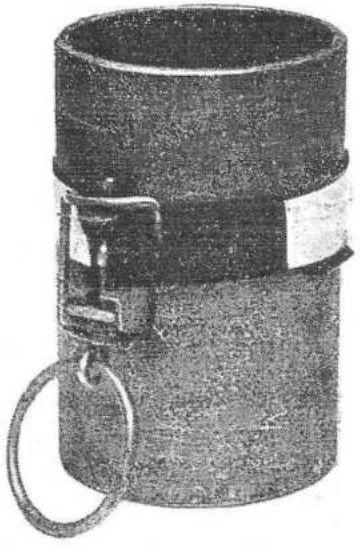
WEIGHT- 320 gm
DIAMETER- 53mm
LENGTH- 84mm

For use the grenade must be loaded with a spotting charge. Ensure the grenade is put together properly with the safety strip in place. Insert the spotting charge in the top of the grenade and screw the cap on. The grenade is now ready for use in the normal manner.

The body of the grenade is painted black with a gold safety strap.

RG Cv 5
Photo- Ed Strazdes

Rucni Granat Cvicny 58 (RG-Cv-58)



RG Cv 58

This is a version of the RG-4 used for throwing practice. It is little more than a piece of pipe of the correct size, with lugs for the safety pin welded on the side. The safety strip fits through the grenade held in place by the safety strap. The safety strap is locked on by the safety pin fitting through the lugs on the body. The construction of the grenade ensures it may be used many times as there is little to break or get damaged during use.

All actions required to throw the normal RG-4 are practiced with this grenade.

Rubber Training Grenades

These are solid rubber dummies that were used for practice and training in throwing hand grenades.

The body shape has been taken from the vz21 grenade. It is unknown when these were taken into use however they were used for many years. Use has now been discontinued. These grenades were in use by the Czech Army, Svazarm (former Communist political organization for youth training and military promotion), schools, and sports organizations. They were

Rubber Training Grenade

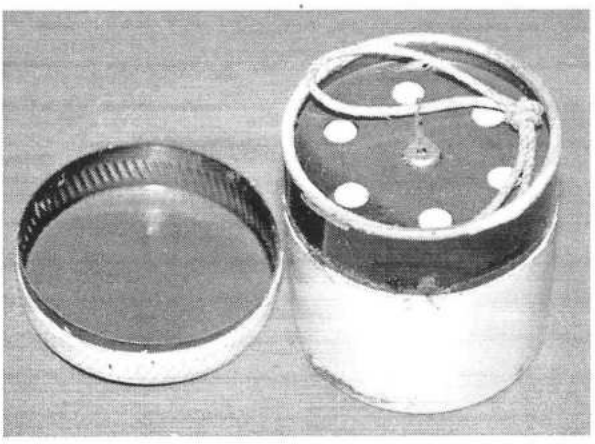
TYPE- Training
WEIGHT- 350 gm
DIAMETER- 56 mm
LENGTH- 117 mm

Rubber Training Grenade

produced by the Gumarny Zubri factory and were not only supplied to the army but could be bought by anyone in sporting goods stores.

There are two versions, one simply a rubber casting the other with the same shape but has the addition of a carrying ring at the bottom end.

The grenade is black and has embossed markings around the middle of the body giving the manufacturer, weight, and stock number. The carrying ring is yellow if fitted.

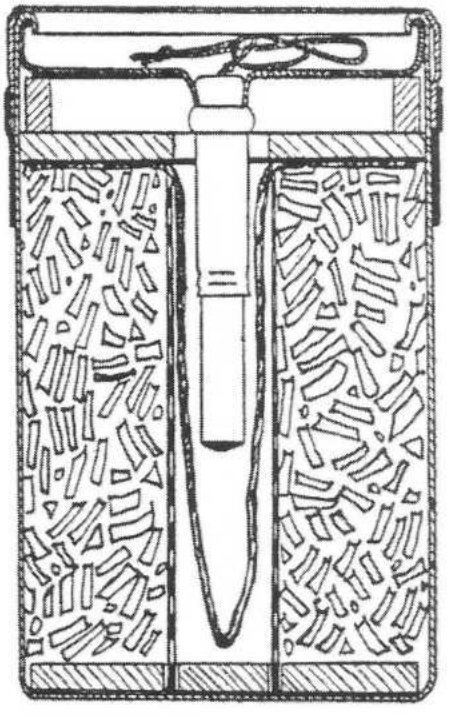


DA 60
Photo- Zdenek Horak

Dymovnicka 60 (DA 60)

This is a signal smoke grenade in use since the 1950's that has been now been replaced in service by the DA25.

The body is made of steel plate in a cylindrical form. The top is closed by a press fit cap that is retained in position by adhesive tape. Located under the cap is the lid of the grenade that has six emission holes evenly spaced around the centre of the grenade. The emission holes are closed off by a paper disc below the lid. The filling is inserted so there is a hole down the centre. A TZ-1 friction igniter is mounted in the centre of the grenade and has a pull string attached. A piece of quickmatch is inserted in the central hole just below the igniter to aid in igniting the filling.



DA 60

TYPE- Smoke, Signal
WEIGHT- 152 gm
DIAMETER- 50.8 mm
LENGTH- 84.2 mm
FILLING- Smoke composition
IGNITER- TZ-1, TZ-2 Friction
FUZE DELAY- 3.5-5.5 sec.

For use, remove the tape, pull off the top cap and grasp the pull string. When the string is pulled the friction igniter functions and ignites a delay element. Throw immediately. After a delay of 4.5-6 seconds the igniter flashes into the central hole and ignites the quickmatch. The quickmatch ignites the main filling and the grenade will begin to emit smoke through the emission holes in the top. The smoke will be actively emitted for a period 15-40 seconds depending on the colour.

DA60b- produces white smoke for a period of 30-40 seconds.
DA60m- produces blue smoke for a period of 15-30 seconds.
DA60or- produces orange smoke for a period of 30-40 seconds.

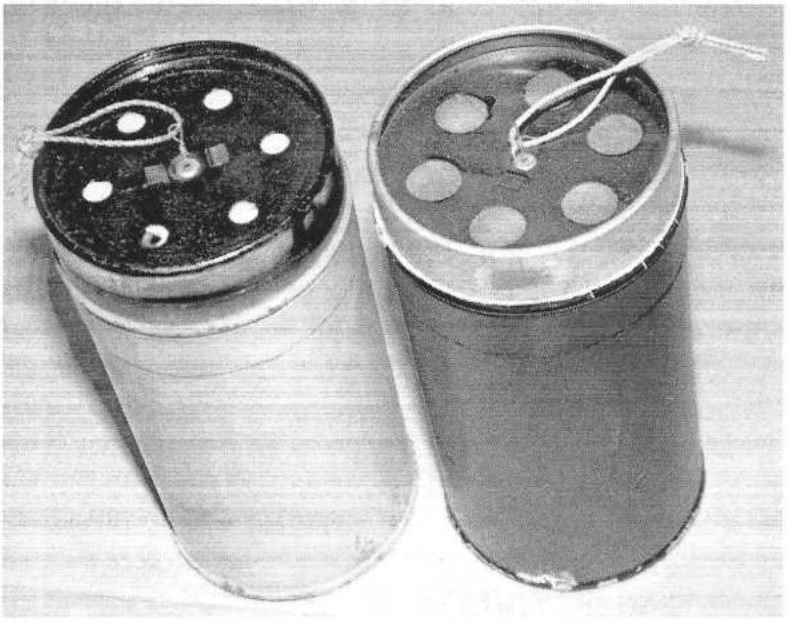
DA 600

TYPE- Smoke, Screening
WEIGHT- 940 gm
DIAMETER- 83.6 mm
LENGTH- 171 mm
FILLING- Smoke composition
IGNITER- TZ-1, TZ-2 Friction
FUZE DELAY- 3.5-5.5 sec.

Dymovnicka 600 (DA 600)

This is an older model in use since the 1950's that has now been replaced in service by the DA100. The DA600 is more a smoke pot than a smoke grenade. Produced in a number of colours it likely has a dual purpose of signaling and production of a smoke screen. The grenade is large and heavy and would be

more effective if placed in position rather than being thrown.



DA 600
Photo- Zdenek Horak

The body is constructed from steel plate in a cylindrical form. Basically it resembles a tin can with a press fit cap. The top cap is retained in place by adhesive tape. Once removed it exposes the inner lid that has six emission holes evenly spaced around the centre. The emission holes are closed by a paper or cardboard disc below the lid. A TZ-1 friction igniter is mounted in the centre of the grenade with a pull string attached. The filling is loaded so there is a hole running through it the full length of the grenade. A length of quickmatch is inserted just below the igniter to aid in igniting the filling.

The weight of the grenade differs depending on the colour. This is due to the different chemical makeup of the various coloured fillings. They also have different sizes of emission holes depending on the colour. This is likely due to black and white smoke being used as screening smoke and the colours being used as signals.

The grenade is produced in a number of colours including orange, white, and black. It appears the body is painted in the colour of smoke produced.

For use, remove the adhesive tape and pull off the closing cap. This exposes the pull string of the igniter. When the string is pulled, the friction igniter ignites a delay element. Once the delay element burns down, it flashes into the centre hole igniting the quickmatch that then ignites the main filling. Once the filling is ignited the grenade will begin emitting large quantities of smoke for a period of 150 to 200 seconds.

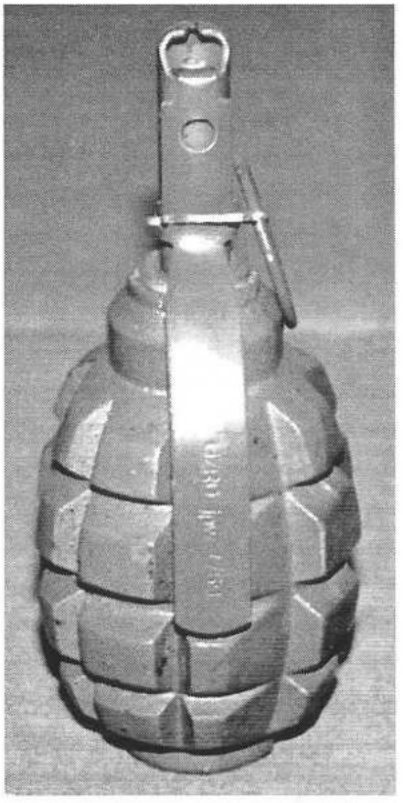
RG-F1

TYPE- Fragmentation
WEIGHT- 600 gm
DIAMETER- 55 mm
LENGTH- Body 86 mm
FILLING- 50-56 gm
IGNITER- UZRGM
FUZE DELAY- 3.2 – 4.2 sec.

DA100b- produces White smoke
DA100cr- produces Black smoke
DA600or- produces Orange smoke

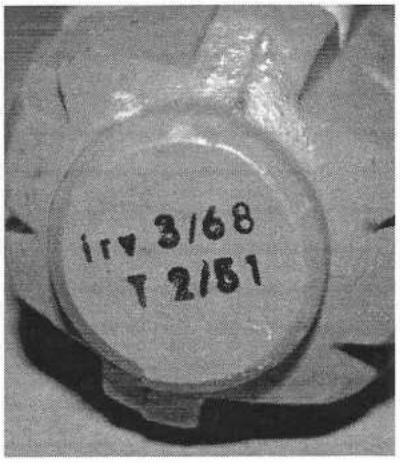
Rucni Granat F1 (RG-F1)

This is a Czech produced copy of the Russian F1 grenade. As such it is virtually the same as the Russian produced grenade but appears to be of better quality manufacture and finish.



RG F1
Photo- Zdenek Horak

The body is made of cast iron with external segments in four rows. A hole in top of the body is threaded to fit the fuze mechanism. The body is filled with TNT and a liner is fitted into the hole to form a fuze well as well as sealing



RG F1 Markings
Photo- Zdenek Horak

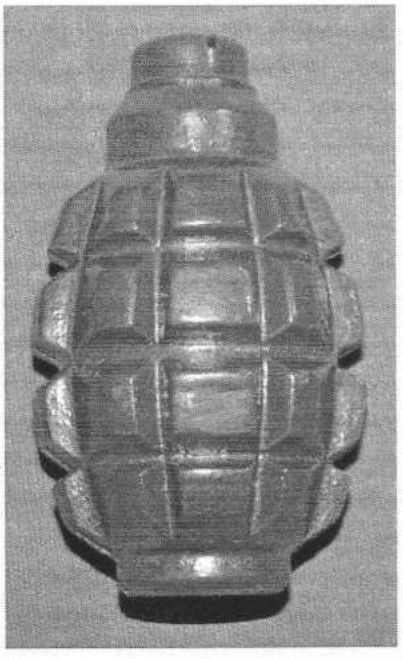
the grenade. A UZRGM fuze mechanism is screwed into the top of the grenade.

RG-Cv F1

TYPE- Practice
WEIGHT- 550 gm
DIAMETER- 55 mm
LENGTH- Body 86 mm
IGNITER- UZRGM Cv
FUZE DELAY- 3.2-4.2 sec.

For use, take the grenade in the throwing hand and hold the safety lever against the body. Pull the safety pin out and throw the grenade. The UZRGM fuze mechanism will function and cause the grenade to explode after a delay of 3.2 – 4 seconds. Being cast iron the body will shatter into fragments with some fragments dangerous out to 200 metres, but the effective radius is only 20 metres. Typically the body shatters into a few large fragments, some medium and small fragments and some cast iron dust. This is normal with most cast iron grenades that are segmented on the outside.

The grenade is painted green with markings on the bottom in black. Markings give the manufacturer, lot number, and date of manufacture. The fuze mechanism is stamped on the fuze lever. Markings on the fuze mechanism give the designation, month and year of production, and manufacturer.



RG-F1 Dummy
Photo- Zdenek Horak

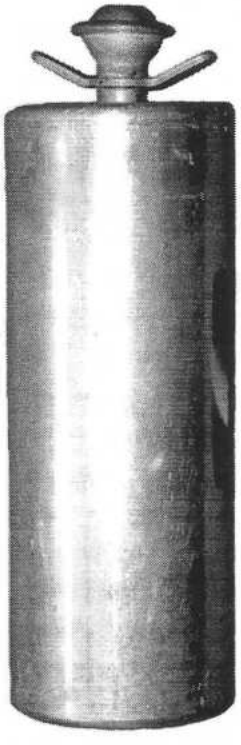
Rucni Granat Cvicny F1 (RG-Cv F1)

This is a practice grenade similar to the Russian URG without bottom hole.

RG-F1 Dummy

This is a throwing dummy in the shape of the RG-F1. The grenade is cast iron, weighted to match the live grenade.

The body is painted red to quickly identify it as a training grenade and to make it easier to find after throwing.



RGSL (1960's)
Photo- Zdenek Horak

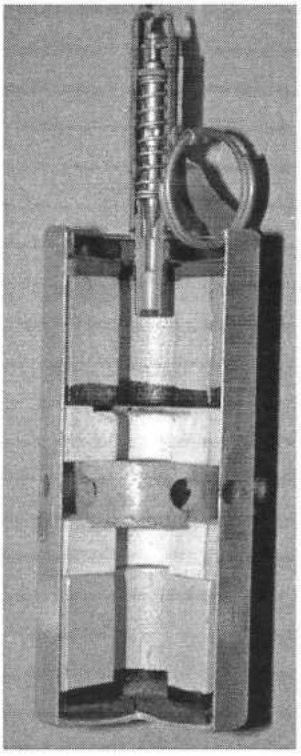
Rucni Granat Slzny (RGSL)

Introduced in the 1960's this grenade was used until replaced by the newer smaller version of the RGSL.

The body is made of aluminum plate. Both the top and bottom ends of the body are rolled over onto the end closing plates. There are six emission holes evenly spaced around the igniter adapter on the top closing plate. The igniter is the TZ-2 friction igniter as is used in most Czechoslovakian smoke grenades. In storage the top is normally covered by a press fit cap until the igniter mechanism is screwed in.

RGSL (1960's)

TYPE- Gas
DIAMETER- 50 mm
LENGTH- 135mm body only
FILLING- Antracen
IGNITER- TZ-2
FUZE DELAY- 4.5-6 sec.



RGSL (1972)
Photos- Zdenek Horak

The body is unpainted with a white stripe on the top cap.

Rucni Granat Slzny (RGSL)

Introduced in 1972 to replace the earlier RGSL, this gas grenade was normally for police use. The RGSL 85 has since replaced it.

RGSL (1972)

TYPE- Gas
DIAMETER- 51 mm
LENGTH- 137 mm total
FILLING- Antracen
IGNITER- UZRGSL
FUZE DELAY- 3 sec.

The body is constructed of aluminum plate. The bottom is closed and the top closing plate has an adapter attached to accept the fuze mechanism. There are emission holes evenly spaced around the centre of the body and possibly one in the bottom plate. The fuze mechanism is a derivative of the standard UZRGM and has a delay of 3 seconds. The filling is in two sections, one section at the bottom and one at the top with a spacer in the filling designed to keep the emission holes clear. A hole in the centre of the filling allows the flash from the igniter to reach both sections and ignite them at the same time.

The body is unpainted with a white band around the lower half of the body. A white label has lettering in black giving the designation, manufacturer, and date of production.

For use, grasp the grenade in the throwing hand holding the safety lever down. With the other hand pull the safety pin out and throw the grenade at the target. Once ignited the grenade will emit a cloud for about 50 seconds covering an area of about 700 cubic metres. Typically gas grenades are thrown upwind of the target so that the gas emitted will be blown onto the target.

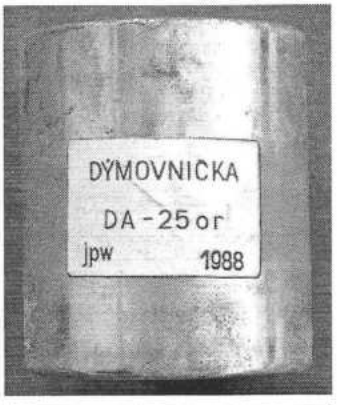
Dymovnicka 25 (DA-25)

DA-25

TYPE- Smoke, Signal
WEIGHT- 110 – 160 gm.
DIAMETER- 51 mm
LENGTH- 60mm
FILLING- Smoke composition
IGNITER- TZ-M
FUZE DELAY- 5-8 sec.
EMISSION TIME- 20-30 sec.

This grenade has been in service since the 1980's. Produced in several colours, its normal use is for signaling.

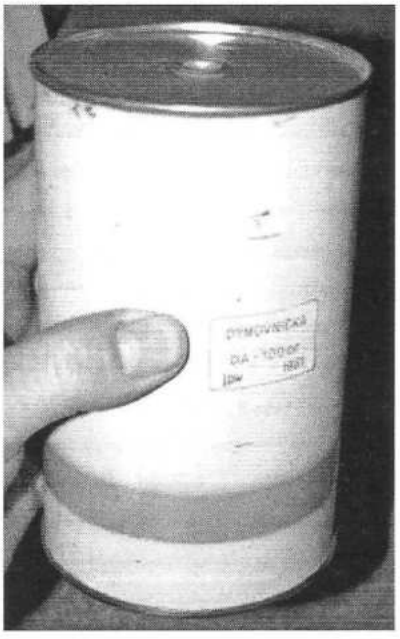
The body is an aluminum cylinder closed at the top by a plastic insert with a threaded fuze well in the centre. Emission holes are evenly spaced around the fuze well. The body is filled with a single pressed pellet of smoke composition and has a priming charge on the bottom. A standard friction igniter, TZ-M screws into the fuze well.



DA-25
Photos- Zdenek Horak

It can also be fitted with electrical igniters if required.

The grenade is normally issued with the top of the grenade sealed with a white plastic cover. Prior to use it must be primed by screwing the igniter in place after removing the cap. For use, unscrew the ball on the end of the igniter and pull; this pulls a coated wire through friction compound causing it to ignite. The friction compound then ignites a delay fuze. After a delay of three seconds, the igniter flashes into the grenade body and ignites the priming charge on the bottom. The priming charge ensures the filling is ignited. As the smoke is formed by the burning smoke composition it is emitted through the emission holes on the top of the grenade. Smoke will actively be emitted for a period of 20-30 seconds.
The body is unpainted except for a band painted around the centre of the body in the colour of smoke produced. In addition there is a self-adhesive label on each grenade, also in the colour of smoke, with markings giving the designation, manufacturer, and date of manufacture.



DA-100or
Photo- Zdenek Horak

DA-100

TYPE- Smoke, Screening
WEIGHT- 900-1340 gm
DIAMETER- 100 mm
LENGTH- 160 mm
FILLING- Smoke composition
IGNITER- TZ-M
FUZE DELAY- 5-8 sec.

DA-25-b- produces white smoke
DA-25-cr- produces black smoke
DA-25-cv- produces red smoke
DA-25-f- produces violet smoke
DA-25-m- produces blue smoke
DA-25-or- produces orange smoke
DA-25-z- produces green smoke
DA-25-zl- produces yellow smoke

Dymovnicka 100 (DA-100)

This is the replacement for the DA600 smoke pot. The body is made of aluminum plate in the shape of a tin can. Contained within the body are three pressed pellets of smoke composition that have a hole in the middle and have a depression on the top of the pellet. The depressions form chambers within the grenade to help in combustion. The pellets are covered by a cardboard disc then a cardboard spacer ring is placed in the top to bring the level up to the top of the body. The body is closed off by the top lid that is seamed onto the body. The lid has a threaded adapter in the centre and emission holes evenly spaced around the adapter. The emission holes are sealed by an adhesive disc that covers the lid. The adapter may be fitted with a TZ-M friction igniter or an electrical igniter.

The grenade should be placed in position to maximize its effect. Once in place unscrew the top of the igniter and pull. A delay of 5-8 seconds will elapse before smoke is emitted.

DA100b- produces white smoke
DA100cv- produces red smoke
DA100cr- produces black smoke
DA100m- produces blue smoke
DA100or- produces orange smoke

Rucni Granat Slzny 85 (RGSL 85)

Introduced in 1985 this grenade replaces the earlier RGSL grenade. The body is an unpainted aluminum cylinder.

RGSL 85

TYPE- Gas
WEIGHT- 300 gm
DIAMETER- 51 mm
LENGTH- 137 mm
FILLING- 45 gm
IGNITER- Percussion delay
FUZE DELAY- 1 sec.

There are four emission holes evenly spaced around the centre of the body. A plastic closing plug fits into the top of the body. There is a threaded well in the centre to accept the striker mechanism. The top edge of the aluminum body is turned over onto the closing plug to seal and retain it in position. The body is filled with two gas composition pellets, one at the bottom and one at the top. The two pellets are separated by a spacer that creates a chamber in the centre of the body corresponding with the emission holes. The pellets have a hole down the centre to allow the flash from the igniter to reach and ignite the pellets. The striker mechanism is plastic with a metal safety lever. The design and operation of the striker mechanism is very similar to the British "Striker mechanism No. 2".

The body is unpainted with a plastic closing plug and striker mechanism. The emission holes are sealed by metallic tape with a single white band in the centre. There is a white self-adhesive label on the body that gives the designation, manufacturer and year of manufacture.

For use, pull the safety pin while holding down the safety lever. When the grenade is thrown the safety lever is forced to rotate forward by the spring-loaded striker. The striker rotates forward under pressure from its spring and hits a percussion cap. The percussion cap fires into a delay element that burns down into the igniter. When the igniter fires into the central hole formed in the filling it ignites the filling. Once the filling begins to burn the pressure build up bursts the tape covering the emission holes and gas begins to emit from the grenade. The grenade will emit gas for a period of 50 seconds covering an area of 700 cubic metres.

Rucni Granat Slzny Cvicny 85 (RGSL 85cv)

This is a training version of the RGSL 85. The grenade emits a red smoke that reacts in a similar manner to the gas produced by the live grenade.

The body is an unpainted aluminum cylinder. There are four emission holes evenly spaced around the centre of the body. A red plastic closing plug fits into the top of the grenade. There is a threaded well in the centre to accept the striker mechanism. The body is filled with two smoke composition pellets, one at the bottom and one at the top. The two pellets are separated by a spacer that creates a chamber in the centre of the body corresponding with the emission holes. The pellets have a hole down the centre to allow the flash from the igniter to reach and ignite the pellets. The striker mechanism is plastic with a metal safety lever.

RGSL 85cv

TYPE- Gas/Training
WEIGHT- 300 gm
DIAMETER- 51 mm
LENGTH- 137 mm
FILLING- 45 gm
IGNITER- Percussion delay
FUZE DELAY- 1 sec.

The body is unpainted with a red plastic closing plug and striker mechanism. The emission holes are sealed by metallic tape with a single red band in the centre. There is a white self adhesive label on the body that gives the designation, manufacturer and year of manufacture.

RGSL 85cv

For use, pull the safety pin while holding down the safety lever. When the grenade is thrown the safety lever is forced to rotate forward by the spring-loaded striker. The striker rotates forward under pressure from its spring

URG-ZC

TYPE- Fragmentation
WEIGHT- 400 gm
DIAMETER- 61 mm
LENGTH- 117 mm
FILLING- 44 gm Semtex U
IGNITER- Delay
FUZE DELAY- 3.2 – 4.6 sec
EFFECTIVE RADIUS- 8 metres

and hits a percussion cap. The percussion cap fires into a delay element which burns down into the igniter. When the igniter fires into the central hole of the filling pellets it ignites the filling. Once the filling begins to burn the pressure build up bursts the tape covering the emission holes and smoke begins to emit from the grenade.

URG-ZC
Photo- Zdenek Horak

Univerzalni Rucni Granat se Zapalovacem Casovym (URG-ZC)

This is the prototype grenade used to develop the URG-86.
The body became the body used in the service URG-86. It is entirely plastic molded in a pear or tear drop shape. The outside has a molded waffle pattern to provide a good gripping surface. There are about 1900 preformed metal fragments encased in the lower portion of the plastic body. The fragments are suspended in a plastic matrix contained within the outer body. A cavity formed in the centre of the plastic matrix is filled with 42 grams of plastic explosive as the main bursting charge.

URG-86

The igniter mechanism is a conventional percussion type utilizing time delay for ignition. The safety lever fits over the top of the mechanism holder and its handle is bent to conform to the shape of the grenade body. The mechanism holder is formed of the same plastic used for the grenade body.

The entire grenade other than the safety lever is made of light green plastic known as "Krasten".

Univerzalni Rucni Granat vz 86 (URG-86)

This grenade was adopted for use in 1986. The official designation is "Univerzalni Rucni Granat vzor 86" shortened in normal use to URG-86.

The body is plastic molded in a pear or tear drop shape. The outside has a molded waffle pattern to provide a firm gripping surface. There are about 1900 preformed fragments encased in the lower portion of the plastic body. The fragments are suspended in a plastic matrix contained within the outer body. A cavity formed in the centre of the plastic matrix is filled with 42 grams of plastic explosive as the main bursting charge.

URG-86

TYPE- Fragmentation
WEIGHT- 440 gm
DIAMETER- 60 mm
LENGTH- 117 mm
FILLING- 43 gm Semtex U
IGNITER- Impact/Delay
FUZE DELAY- 3.2 – 4.6 sec.
ARMING DELAY- 1.2-2 sec.
EFFECTIVE RADIUS- 8 metres

The fuze mechanism is a combination time/impact type with a self-destruct feature. There is a switch on the side of the fuze to switch between time fuzed ignition and impact ignition. When the switch is in the horizontal position impact ignition is activated, when the switch is down, the fuze uses the time delay.

When the grenade is thrown, the safety lever rotates forward and releases from the body. A plunger is released as it rotates. A striker rotates and strikes a percussion cap igniting a delay element. The delay burns down for a period of 1.2 seconds and arms the impact igniter. The delay continues to burn acting as the self-destruct. The impact igniter is designed to operate in any condition including sand, snow and tall grass. If the grenade does not explode on impact the self-destruct will cause explosion after a delay of 3.2 an 4.6 seconds after the safety lever is released.
The entire grenade is made of green plastic. The top of the striker lever is marked with the designation "URG-86" date of manufacture and manufacturer.

URG-86Rd

TYPE- Practice
WEIGHT- 440 gm
DIAMETER- 60 mm
LENGTH- 117 mm
FILLING- Practice spotting charge
IGNITER- Impact/Delay
FUZE DELAY- 3.2 – 4.6 sec.
ARMING DELAY- 1.2-2 sec.

Redukovany Univerzalni Rucni Granat vz 86 (URG-86Rd)

URG-86Sk

This is the practice version of the URG 86. It's construction is the same as the live grenade but has an inert filling. The fuze mechanism is replaceable and contains a spotting charge to simulate the explosion of a live grenade.

The body of the grenade is black plastic denoting an inert body; the fuze mechanism is green denoting a live mechanism. The top of the striker lever is marked with the designation "URG-86-Rd", date of manufacture, and manufacturer.

Skolni Univerzalni Rucni Granat vz 86 (URG-86Sk)

This is a totally inert version designed for classroom instruction and throwing practice. During use, parts may become damaged so a replacement parts set is provided to replace damaged components.

The entire grenade is made of black plastic denoting an inert munition. The top of the striker lever is marked with the designation "URG-86-Sk", date of manufacture, and manufacturer.

URG-86Sk

TYPE- Instructional
WEIGHT- 440 gm
DIAMETER- 60 mm
LENGTH- 117 mm
FILLING- Inert
IGNITER- Inert Impact/Delay

East Germany

The "Deutsche Demokratische Republik" existed from Oct 7, 1949 to Oct. 3, 1990. It was formed from the Soviet Occupied Zone of Germany following the creation of the Federal Republic of Germany in the Western Zones in May of 1949. The state reunified with West Germany in 1990 and officially ceased to exist.

During its short existence, East Germany was armed with Soviet designed grenades for the most part. There was some development in East Germany resulting in a modified version of the F1 grenade, an anti tank grenade AK 58-K-100, a smaller version of the RKG 3, and others. Also developed were various training hand grenades that have not been noted in use by other countries of the Warsaw Pact.

Soviet models known to have been used by East Germany include; F1, RG 42, RGD-5, RPG-43, RKG-3, URG-N, and UPG-8.

There were two distinct forces utilizing hand and rifle grenades, the "Nationalen Volksarmee (NVA)" and the "Deutsche Volkspolizei". The NVA used virtually all of the Soviet types of grenades including some of East German design. The border guards who were charged with border security were part of the Volkpolizei. The border guards used a variation of the RDG-5 converted to a rifle grenade and was fired from a cup discharger attached to an AKM rifle.

Once the DDR reunified with West Germany, the NVA was disbanded and elements integrated with West German forces. At this point I believe that the grenades in use by the DDR were rendered obsolete and most likely destroyed.

Handgranate F1

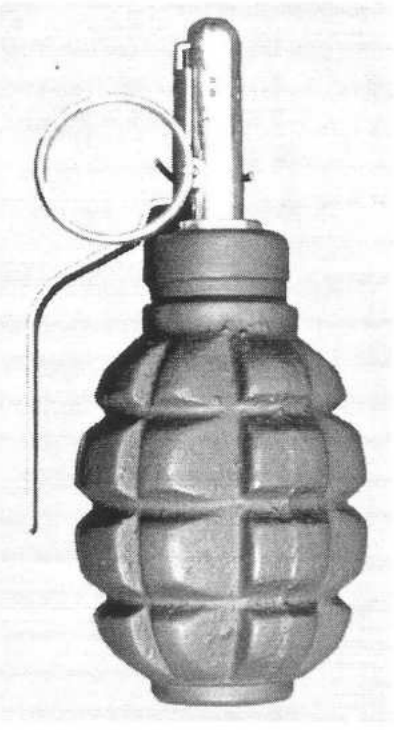
The East German F1 is a modification of the Russian F1. The effects of the grenade are identical to the Russian model.

The body is cast iron with deep external segmentation. There are four rows of segments with a flattened bottom. The top of the body is where it differs from the Russian model. The top is unthreaded and formed with a groove on the outside to take a sheet metal collar. The collar is formed to act as a fuze well and is threaded internally to accept the fuze mechanism. It fits over the top of the body and is crimped into the groove formed on the body. A standard USRG-M or DS-62 fuze mechanism screws into the collar.

Handgranate F1

TYPE- Fragmentation
WEIGHT- 650 gm
DIAMETER- 56 mm
LENGTH- 88 mm body only
FILLING- 55 gm Trotyl
IGNITER- USRGM or DS-62
FUZE DELAY- 3.2 – 4.2 or 3.2 – 4 sec.

The East German manufactured copy of the Soviet UZRGM fuze mechanism is known as USRG-M. The fuze delay is 3.2 – 4.2 sec. The DS-62 fuze mechanism is a close copy of the USRG-M with some minor manufacturing differences. The fuze delay is a bit shorter, giving nominal delay time of 3.2 – 4 sec.



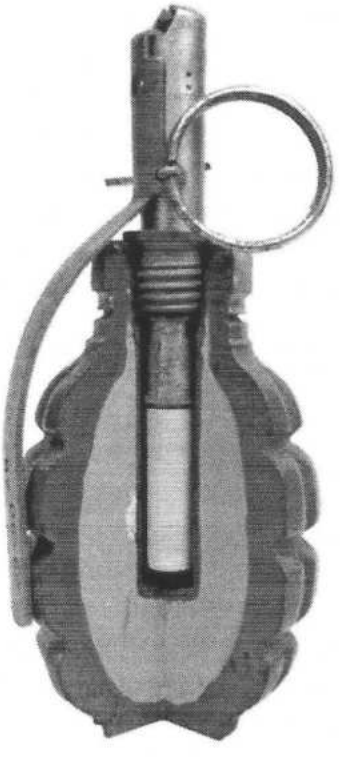
Handgranate F1
Photo- Bob Leiendecker

The grenade is painted green, the fuze mechanism is unpainted.

Handgranate F1 Instructional

This is a sectioned model of the F1 used in classroom instruction. It takes the form of a normal body with a ¼ section cut out. The body is filled with gypsum to simulate the normal filling. An inert igniter mechanism is screwed into the top.

The outside of the grenade is painted the same as a live grenade. The cut edges are painted red and the filling is painted yellow.



Handgranate F1
Instructional Model
Photo- Bernt Bosman

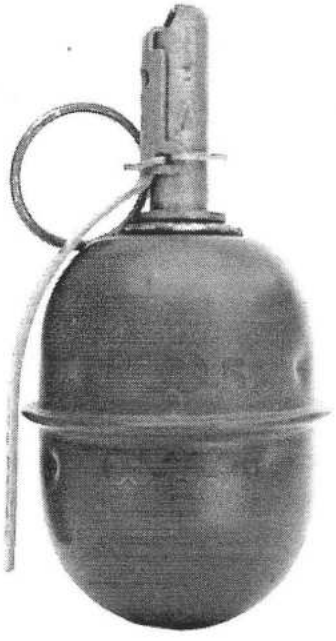
F1 Throwing dummy

This is an East German manufactured dummy used for throwing practice. These were apparently sold in sports stores to practice grenade throwing by civilians. This practice was also used in Czechoslovakia.

Throwing dummy

The body is cast iron in the shape of an F1 grenade. There are large unthreaded holes in both top and bottom closed by white plastic plugs.

The grenade is painted bright red for identification and as an aid to recovering them after use.



Angriffshandgranate RGD-5
Photo- Bernt Bosman

Angriffshandgranate RGD-5

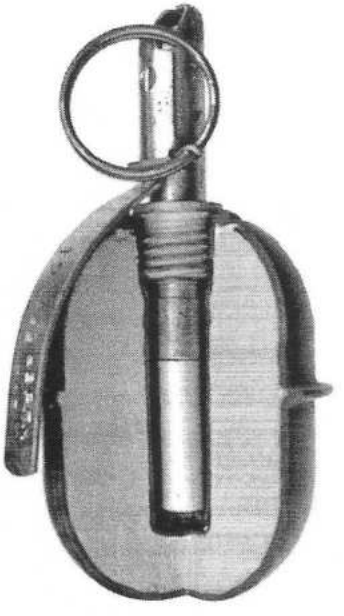
Angriffshandgranate RGD-5

TYPE- Fragmentation
WEIGHT- 310 gm
HEIGHT- 114 mm
DIAMETER- 57 mm
FILLING- 110 gm TNT
IGNITER- UZRGM or DS-62
FUZE DELAY- 3.2-4.2 sec. Or 3.2 – 4.0 sec.
EFFECTIVE RADIUS- 15-20 metres

This grenade was adopted by the East Germans to replace or supplement the F1 and RG 42 grenades in service at the time. It is known to have been produced in East Germany as well as many other countries of the Warsaw pact. The easiest method of determining manufacturing countries other than Russia is from the markings. Countries such as East Germany use Arabic lettering whereas the Russians used Cyrillic lettering.

The body is a two-piece sheet metal outer casing with a thin two piece presegmented fragmentation liner. The body is crimped together in the centre with a prominent seam. The top of the body has an internally threaded plastic liner for the igniter mechanism inserted through a hole in the top. Earlier manufactured grenades have a sheet metal liner. A crimped joint at the top of the grenade locks the liner in place in the upper half of the body. There are a number of "dimples" in the body, located just above and below the centre joint. The purpose of the dimples appears to be to retain the fragmentation liners in place while the grenade is being crimped together. An igniter mechanism screws into the top of the grenade.

The grenade is normally painted olive green with markings in black.



Angriffshandgranate RGD-5
Instructional Model
Photo- Bernt Bosman

Angriffshandgranate RGD-5 Instructional

As with the F1 grenade, an instructional model of the RDG-5 is also produced in East Germany. This is a sectioned model used in classroom instruction. It takes the form of a normal grenade with a ¼ section cut out. The body is filled with gypsum to simulate the explosive filling. An inert igniter mechanism is screwed into the top.

The outside of the grenade is painted the same as a live grenade. The cut edges are painted red and the filling is painted yellow.

Splittergranate RGD-5

This grenade was used by the Border Guards of the Volkspolizei not by the NVA. It is a rifle grenade using the body of the RGD-5 grenade with a tail unit screwed in place of the UZRGM igniter mechanism. It is fired from a

Splittergranate RGD-5

TYPE- Fragmentation, Rifle
WEIGHT- 405 gm
DIAMETER- 51.3 mm
LENGTH- 148 mm
IGNITER- Impact
EFFECTIVE RADIUS- 25 metres

cup discharger mounted on an AKM rifle.

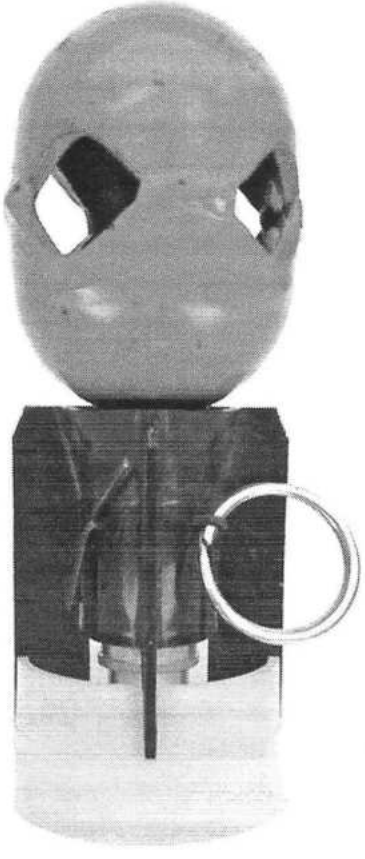
The main body is in fact the body of an RGD-5 grenade without modification. The tail unit consists of a set of plastic fins, Sabot with metal disk, and the igniter mechanism. A safety pin fits through the assembly preventing the impact igniter assembly from operating.

The grenade body is painted olive green, the fin assembly is constructed of black and white plastic. The normal markings for the RGD-5 will be found on the body.

The grenades are supplied in cases that contain 20 main bodies, 20 tail assemblies, 20 distance rings, 20 AS-73 detonator assemblies and 20 launching cartridges M-43.

For use the grenade must be assembled by taking a detonator assembly and screwing it into the igniter assembly. A distance ring is slipped over the grenade body then the detonator assembly is inserted into the fuze well of the body and the tail assembly screwed onto the body.

Splittergranate RGD-5
Photo- Bob Leiendecker



Ubungssplittergranate RGD-5
Photo- Bernt Bosman

Ubungssplittergranate RGD-5

This is a training version of the grenade. It is constructed exactly the same as a live grenade but uses inert components. The grenade body is painted red to identify it as a training munition. This particular version is not meant to be fired but is used in classroom training.

Ubungssplittergranate RGD-5 mit Zunder AS-73 Ub.

This is a practice version of the grenade meant to be fired in practice and has a spotting charge available for use.

The body is cast iron with four large holes around the middle of the body. The body simulates the weight of a live grenade and the holes allow the smoke and gasses produced by the spotting charge to escape.

Panzerhandgranate AZ-58-K-100

This is an East German designed anti tank grenade that was also adopted and produced by Hungary. The design was also copied at least experimentally by the Americans in the XM78.

The grenade is mainly constructed of aluminum. The head is cone shaped and contains a copper shaped charge liner, the main explosive charge and the primer and detonator in the base. The bottom end has a large threaded portion that allows the handle assembly to screw on. The top end of the head is closed by a wind shield that also ensures the proper standoff for the

Panzerhandgranate AZ-58-K-100
Photo- Bob Leiendecker

shaped charge. The handle is cylindrical and contains the fuze mechanism, an inner and outer tube, the drogue and deploying spring. A safety handle runs along the handle and is held in place by a safety pin. The bottom end of the handle has a groove formed on the outer side that also forms a ridge on the inside of the tube. This ridge acts as a stop to prevent the internal tubes from completely disengaging from the grenade as they deploy.

The grenade is painted green with markings in black. Markings on the head give the designation, lot number, and filling.

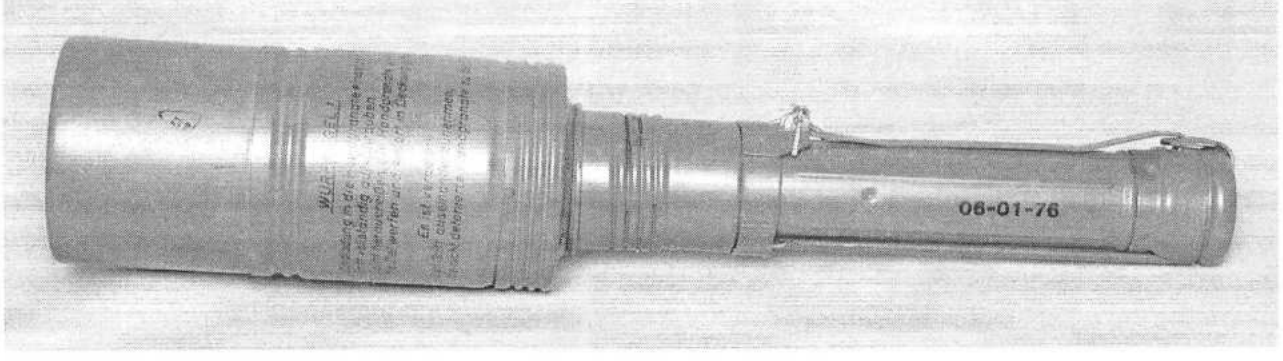
The top end of the lever covers a spring loaded pin and serves to hold the drogue in position in the handle. Once the handle is released, it is pushed out of the way and falls away releasing the pin and drogue. When the pin springs out, it completes the first stage of arming. The spring in the drogue reasserts itself and pushes itself out of the handle pulling the drogue with it. The spring stays in a cloth tube on the end of the drogue forming a weight. As the drogue deploys it pulls out the inner then outer tube. At the same time it pulls a cord attached to a safety pin in the fuze. The cord withdraws the safety pin and completes the arming sequence. Once armed the fuze will operate on impact or graze. The combination of extended tubes and the drogue keep the grenade flying head first after throwing.

Panzerhandgranate AZ-58-K-100

TYPE- Anti tank, HEAT
WEIGHT- 862 gm
DIAMETER- 94 mm
LENGTH- 285 mm
FILLING- 377 gm A-1X 1
IGNITER- Impact

Panzerhandgranate RKG-3Cu

The East Germans used the RKG-3, RKG-3M, RKG-3E and RKG-3EM. These are most likely of Russian manufacture. The East German produced version is marked as RKG-3Cu.



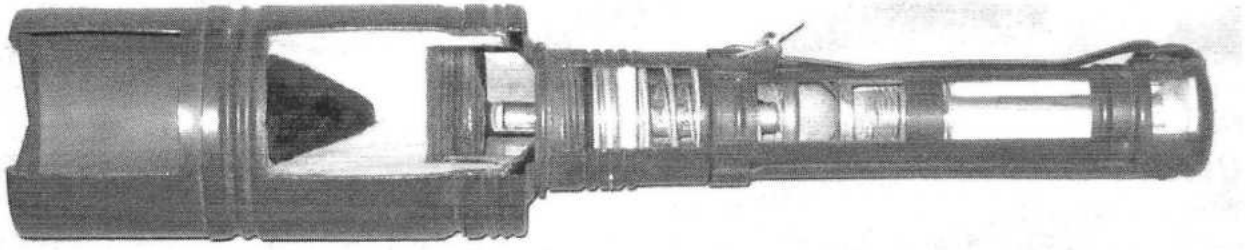
Panzerhandgranat RKG-3Cu
Photo- Ed Strazdes

Construction and operation of the grenade is identical to the Russian models. The size of the East German model is similar to the earlier versions of the Russian grenade. Later versions produced by Russia were larger to improve penetration.

The grenades are painted olive green with black markings. They are marked on the top with the designation, filling and lot number. Instructions for use are printed on the side of the warhead. All markings use Arabic letters instead of Cyrillic as in the Russian models. The top of the body is marked with the designation.

Panzerhandgranat RKG-3Cu

TYPE- Anti tank
WEIGHT- RKG-3 and RKG-3M- 1070 gm
RKG-3EM- 1115 gm
DIAMETER- 68 mm RKG-3Cu
LENGTH- 360 mm RKG-3Cu
FILLING- RKG-3 and RKG-3M- 310 gm TH-50 or TH 45/55
RKG-3EM- 390 gm TH-50
IGNITER- Impact, base detonating
FUZE DELAY- none



Sectioned RKG-3Cu used for classroom instruction

East Germany also produced a sectioned model of the grenade used for classroom training. The grenades were packed in individual plywood boxes fitted to hold the grenade.

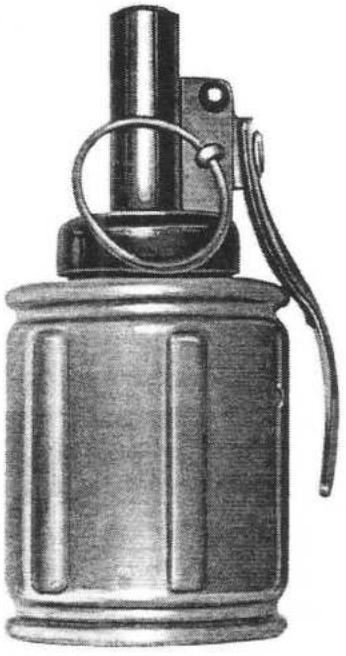
Exerzierhandgranate

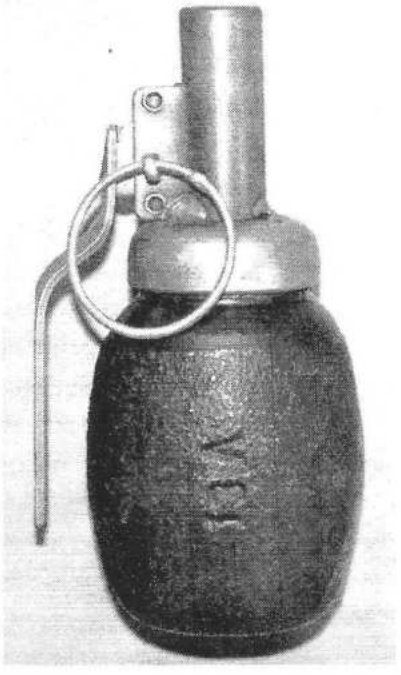
East Germany produced a series of exercise hand grenades meant to simulate at least three types of hand grenade.

Exerzierhandgranate F1 represents the F1 grenade.
Exerzierhandgranate RG 42 represents the RG 42 grenade.
Exerzierhandgranate RDG 5 represents the RDG 5 grenade.

The igniter mechanism appears to be the same on all versions. The differences are in the body shapes which resemble appropriate grenades. The main body appears to be cast iron for the F1 and RDG 5, but the construction of the RG 42 body seems to be of sheet steel or iron. The top of the body has a large threaded portion for the igniter mechanism to screw onto. The bottom of the body has a large hole to allow the smoke and gasses from the exploding charge to escape. The igniter mechanism is constructed so that all parts, including the safety lever, remain attached. The igniter mechanism can easily be reset and reloaded with a new charge.

The charge is a special 36mm blank cartridge that resembles signal cartridge. It has an aluminum casing 75.5 mm long. The base has a primer inserted into a brass primer holder. Two 3 mm holes are drilled on either side of the primer holder. The cartridge contains an aluminum cased charge that is placed just on top of a fuze delay tube filled with black powder that is placed over the primer vents. There are several cardboard discs on top of the charge and the cartridge finally closed by a black painted cardboard disc. The cartridge itself is painted red with markings in black on the side. The marking found on the side are "Knallsatz f.Ub.Hdgr. Nicht aus der leuchtpist. Verschiessen Bei Versager Knallsatz sprengen". This can be translated as "Detonating blank load for





Exerzierhandgranate F1 | Exerzierhandgranate RG 42 | Exerzierhandgranate RDG 5

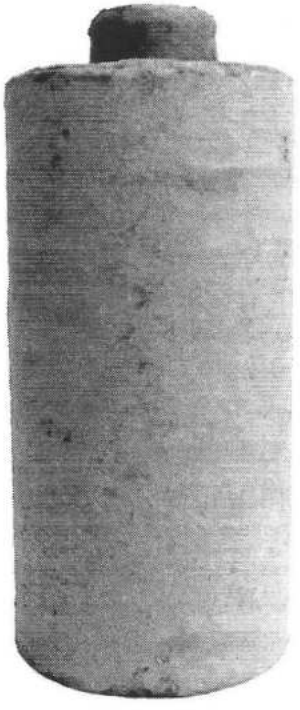
exercise hand grenade, not to be fired in signal pistol, Blind loads must be disposed of by exploding."

When the grenade is to be used, remove the igniter mechanism and ensure it is set properly. Load the cartridge and screw the igniter back onto the body. The grenade is now prepared for use. When the safety pin is removed the grenade is held safe in the throwing hand by holding the safety lever down. When the grenade is thrown, the safety lever rotates up on an axis pin, remaining attached the grenade. The rotation of the lever releases a striker which is forced down under spring pressure. When the striker hits the percussion cap in the cartridge it the cap fires and ignites the delay element. The delay element burns down and sets off the main charge.

Nebelkorper S-32

This is a smoke munition developed in East Germany. More of a smoke generator than a grenade it can however be used in the same manner as a grenade.

The main body is a cardboard cylinder closed at the bottom. The top of the body is also closed but has a match head friction igniter mounted in the centre. The igniter is covered by a cap which contains a striker board. The bottom 2/3 of the body is filled with a smoke compound. A starter mixture covers the top of the smoke compound leaving a space at the top of the body to ensure proper burning of the compound.



Nebelkorper S-32
Photo- Bernt Bosman

The grenade appears to be unpainted but I must assume some type of waterproofing compound covers the body. There is normally an instruction label pasted to the body.

For use, remove the cap covering the match head retaining the cap. Using the friction board portion of the cap, firmly rub the board on the match head and ensure ignition. Either throw or place the grenade in position. After a delay of about 7 seconds the grenade will emit black smoke through emission holes in the top for a period of 90-120 seconds.

Nebelkorper S-53
Photo- Bernt Bosman

Nebelkorper S-53

This is a smoke grenade developed for use by East German forces.

The body is a cardboard cylinder with a match head igniter mounted in the centre of one end. A hollow cardboard throwing handle is attached to the other end. The body is filled with smoke compound with a starter mixture on top. The igniter is covered by a cap with a friction board incorporated.

The grenade appears unpainted but I must assume that some kind of waterproofing coating covers the body. An instruction label is normally pasted on the side of the body.

For use, remove the cap covering the match head and retain the cap. Using the friction board portion of the cap, firmly rub the board on the match head and ensure ignition. Throw the grenade immediately. After a delay of about 7 seconds the grenade will emit white smoke through emission holes in the top for a period of 30 seconds. Once ignited this grenade will continue to burn and emit smoke when submerged in water.

Nebelwurfkorper

The Nebelwurfkorper is used for signaling and may be used to create a smoke screen. It is known to be produced in white, black, green, orange, red, and possibly others.

Nebelwurfkorper

The body is a drawn aluminum canister that has a bakelite fuze mechanism mounted in the top. An aluminum cap fitting totally over the top of the cylinder closes and weatherproofs the grenade. A pull-tab on the closing cap is used to pull off the top of the closing cap to expose the fuze mechanism. The bakelite fuze mechanism holder includes eight emission holes evenly spaced around the fuze. A flash tube is attached to the bottom of the fuze to allow the flash of the igniter down through the filling.

For use, grasp the grenade in the throwing hand and grasp the pull-tab with the other. Pull off the top cap of the grenade, and then grip the igniter string. A pull on the string causes the igniter to fire and ignite the delay element. The delay element burns for a period of about 3.5 seconds (+2.0 sec. –0.7 sec.) and ignites the ignition compound. The ignition compound ignites the smoke compound that begins to burn. Smoke is emitted through the top of the grenade.

Nebelwurfkorper

TYPE- Smoke, Signal
DIAMETER- 60.5 mm
LENGTH- 100 mm
FILLING- Smoke composition
IGNITER- Friction?
FUZE DELAY- 3.5 sec. Nominal

The body is painted dark green with a band near the top in the colour of smoke produced. Other markings are normally in the colour of smoke produced but may also be in white with only the band in the colour of smoke. Markings include the designation in German and Russian with all other marking in German only. The marking give the temperature range, delay, NVA number and instructions for use. The coloured band includes a marking that may be a lot number.

Hungarian Grenades

Hungary was part of the Austro-Hungarian Empire until its collapse after WWI. Hungary separated from Austria on 31 October 1918. In 1919 the Communists took over declaring the Hungarian Soviet Republic. The republic was short lived being defeated by an invading Romanian Army on 6 August 1919. Admiral Horthy was elected Regent in 1920 remaining in power until 1944. In the 1930's Hungary formed an alliance with Germany later taking an active part in WWII on the Axis side. In 1944 Hitler replaced Horthy with a Nazi collaborator to prevent Hungary defecting to the Allied side. Following the war, Hungary came under Soviet influence after a short period of democracy in 1946-47. In 1948 Communists took over establishing a Stalinist type state that proved intolerable for the country. In 1956 the Hungarian Revolution took place including an announced withdrawal from the Warsaw Pact. This led to Soviet intervention to put down the revolution. From 1960 to the late 1980's Hungary remained a member of the Warsaw Pact. In the late 1980's Hungary led the way to dissolve the Warsaw pact and moved to a multiparty democracy. Following the collapse of the Soviet Union in 1991 Hungary formed closer ties with Western Europe and joined Nato in 1999.

Grenades used by the Austro-Hungarian Empire will not be included in this book. Only grenades produced after 1919 will be included.

The Hungarian Military used a modified WWI grenade after the First World War, the Model 28, otherwise known as the "Goldman Type". In 1931 the 31M "Wesiczky type" replaced it in service. This grenade had serious problems with its ignition system. In 1936 the 36M "Vecsey type" and in 1937 the 37M "Demeter type" were introduced. In June of 1938 both new grenades were tested prior to adoption. The tests indicated that the wall thickness of 0.8mm was too thick for the grenades and production of the grenades with a wall thickness of 0.5mm began shortly thereafter. The 37M had an advantage over the 36M in that it was not effected by soft ground. Its disadvantages were that it required a stronger rotation to arm and its chemical ignition system became unreliable in long term storage. Upon adoption of the new grenades the 31M was moved to second line service and placed in storage. At the beginning of WWII, Hungary still had 322,000 31M grenades remaining in storage.

In January 1942 reports were received from the commanders of the Karpat-csoport and Gyorshadtest on the M1936 grenade. The reports indicated that the 36M performed well in normal battle conditions, however when fighting in built up areas or the close confines of a forest it was lacking. The short ranges of this type of fighting did not give the grenade enough time to arm due to the time required for the safety cap to unscrew. Also in low angle throwing the soldiers could not impart enough spin for the grenade to work properly. The report also indicated that the safety pins could fall out during rough handling. The commanders recommended changing to the German Sthgr 1924. As a result of these reports, engineers, including Captain Zoltan Vecsey, began testing the German grenade at the Institute of Military Technology. The results of the testing did not recommend the German grenade for adoption as its method of ignition could allow the grenade to explode before throwing. The recommendation was for a new grenade using an ignition system based on the Soviet M1933 grenade. Captain Vecsey undertook development of the new grenade.

During WWII Hungarian forces were also supplied with German grenades. This included the Stiehandgranate 24, the Eihandgranate 39, and as a rifle grenade the Gewehr Sprenggranate 30 that was produced under license in Hungary. The grenade is identical to German manufactured grenades, differing only in the manufacturers marking.

In 1943 the 36M was still in production but had a failure rate of 5-10 percent. Changing the detonators from the M34 to the M34/a filled with lead azide reduced the amount of failures.

On 4 October 1943 the new 42M grenade was adopted and began production. Its fuze was operated automatically

by the inertia of throwing igniting the delay fuze. A report dated 22 July 1943 indicated that there was some 2,371,500 36M grenades in stock and an order of 2,500,000 42M grenades had been let. The 42M continued in production until the late 1980's and remained in service until 1995. An interesting note on the 42M is that it is one of the only pieces of equipment that survived the Royal Hungarian Army continuing in service under the communists.

When the Communists took over, hand grenade development stopped in Hungary and the typical Russian grenades were taken into service. These included the F1, RG 42, RDG 33, RPG 40, RPG 43, and RPG-6. The RG 42 lasted until the 1960's, the antitank grenades were replaced by the RKG-3E and RKG-3EM in the late 1970's, and the F1 remained until the 1980's. In addition the East German 50-K-100 AT grenade was adopted for use.

Beginning in the early 1990's development started on a new series of grenades. The first, 90M Tabak, was developed by "Mechanikai Muvek RT, Budapest". The grenade failed in factory testing with too many duds and some that fired during transport.

The next was the "David" grenade developed sometime between 1990 and 1993. The developers were Jozsef Feher and Istvan Juhasz. Both developers worked for HTI (Hungarian Military Technical Institute). Several versions were developed, none of them passing factory testing.

The next development came from Nike-Fiocchi in 1992-93. A number of body types and materials were tested to come up with a simple easy to produce body. The 92M grenade was developed out of these tests. The fuze mechanism of the 92M was not successful in tests. Nike-Fiocchi continued development using the 92M body type.

Hungary purchased a small number of Austrian Arges type grenades for testing. Apparently negotiations took place to purchase manufacturing rights but were not successful.

Development of a new fuze mechanism that is either a direct copy of or was heavily influenced by the Arges type eventually led to the adoption in 1997 of the 93M defensive grenade. In about 2003 the 96M offensive grenade was brought into service as stocks of the older 42M grenade ran out. The 93M and 96M are the current grenades of Hungarian Armed Forces.

31 M (Wesiczky)

31M (Wesiczky)

TYPE- Offensive
WEIGHT- 300 gm
HEIGHT- 83mm
DIAMETER- 47mm at centre
FILLING- 115 gm Trotyl
IGNITER- Impact
DETONATOR- 2 gm primer
EFFECTIVE RADIUS- 5-10 metres

Designed in about 1931 this grenade was the main Hungarian grenade until replaced by the 36M and 37M in 1938. Stocks of the 31M were then moved to second line service and placed in storage. At the beginning of WWII there was about 322000 31M grenades remaining in storage.

This is an offensive grenade with a body made out of sheet metal. The body is made in two parts. The lower part is basically a cup with a protruding band formed in the body near the bottom. The upper part is somewhat cone shaped and is seamed onto the bottom half forming another protruding band at the seam. The igniter mechanism fits through a large hole in the top of the grenade body.

31M (Wesiczky)
Photo- R. Leiendecker

The igniter mechanism is fairly complicated. The igniter housing is made up from two pieces, an upper portion made of an alloy material and a sheet metal lower housing. There are upper and lower conical walls fixed within the lower housing. A detonator cup is attached to the bottom of the lower housing. A press fit cap closes the igniter mechanism and acts as a safety device. Directly under the cap is a diaphragm, below that a heavy gauge closing plate, and below that a hinged trap door with weight attached. The throwing safety mechanism, consisting of a weight and two rods is located below the trap door. The actual firing mechanism has upper and lower weighted housings. The upper housing has the firing pin attached. The lower housing has the primer mounted. When assembled the lower housing fits inside the upper and is prevented from moving by two retaining balls fitted into holes in the lower housing. There is a creep spring over the lower housing that keeps the two housings from coming completely together and ensures the balls do not fall outward. The throwing safety rods fits down through the upper housing into the lower housing lining up with the holes in the side of the lower housing. The retaining balls are held in place, slightly protruding out of the lower housing by the rods on the inside and creep spring on the outside. The protruding balls prevent the two housings from closing together. The ends of the two housings are conical and rest against the conical walls of the main igniter housing.

To operate the grenade, remove the cap and press the diaphragm until it inverts. Once inverted the diaphragm is free to fall out of the grenade, in effect arming it. When the grenade is thrown with a spinning motion, the diaphragm and closing plate fall away and allow the trap door, under some pressure from a spring, to open. The throwing safety, with an assist from another spring and the centrifugal force of the spinning grenade, begins to pull out from the firing mechanism. As the safety pulls out, the rods pull away from the retaining balls allowing them to fall inwards. At this point, the two firing mechanism housings are only held apart by the creep spring surrounding the lower portion. Upon impact, the weighted sections of the firing mechanism move against the

conical walls of the housing. The influence of the conical walls on the conical ends of the firing mechanism forces the two housings together against the pressure of the creep spring. The firing pin hits the primer causing it to fire. The primer flashes into the detonator causing it to fire and detonate the main filling.

Live grenades are painted red, there is a throwing practice grenade painted yellow and possibly a practice version that is painted blue.

36 M (Vecsey)

This grenade was designed in 1936 and was adopted by Hungarian forces in 1938 along with the 37 M. It was also modified slightly and adopted by the Swiss as the OHG 40.

36M (Vecsey)

TYPE- Offensive
WEIGHT- 250 gm
DIAMETER- 52 mm
LENGTH- 92 mm
FILLING- 85 gm TNT
IGNITER- Impact

36M (Vecsey)

The grenade is constructed mainly of sheet metal stampings. The outer body is constructed in two pieces, upper and lower. The lower body is simply a cup with an indentation in the bottom, a rib formed about half way up, and threads formed at the top. The top is similar but is coned in and open at the top to allow the arming cap to fit through into the charge containers. A groove is formed at the top just below the hole. Threads formed at the bottom of the top portion engage the threading on the bottom half. There are two charge containers contained in the body. The lower charge container is simply a cup with an indentation in the bottom to correspond to the indentation in the outer body and threads formed at the top. The indentations keep the charges centrally located in the body. A central spacer has threads formed on the bottom to thread into the threads on the bottom charge container. The primer is mounted in the centre of the bottom of the spacer. A small detonator cup is attached to the bottom under the primer. The top of the spacer is not threaded but has a spring wire attached that creates resistance to the upper charge container. The upper charge container is formed so that the striker, striker shield, and spring are held in a channel running through the centre. The top is closed by a cap with an elongated hole in the centre to allow access to the striker. The arming cap fits over the top of the grenade. An inverted cup is attached to the bottom of the arming cap and fits in through the hole in the top of the body. A spindle protrudes out of the inverted cup. The spindle fits through the cap on the upper charge container screwing down and holding the striker in the safe position. When the spindle is in position the striker cannot move into the armed position. There are four holes in the arming cap that when fitted onto the body correspond with the groove at the top of the body. The two pronged safety pin fits through the holes and groove holding the cap to the body.

The grenade is black overall with three red bands around the body. Stamped markings in the dimple in the bottom are likely a manufacturers mark.

For use, pull the leather tab attached to the safety pin. When the pin is removed the top must be held in position by the throwing hand. The grenade must be thrown with a spinning motion so that centrifugal forces cause the

arming cap to pull away. This causes the spindle attached to the cap to pull out like a screw. The centrifugal forces also make the two charges pull apart. Once the top separates from the body, a spring causes the firing pin to rotate into position. On impact, at least one of the charges moves toward the other causing the firing pin to penetrate the primer and fire the grenade. If there is insufficient impact, the spring will pull the firing pin into a safe position. This grenade would not function properly if there was insufficient distance or spin imparted during the throwing action. This was part of the reason it was replaced by the 42M.

36M Practice version

This version may be fitted with a small practice charge. The grenade is constructed the same as a live grenade with all components except the explosive charge. The grenade is black overall with three blue bands indicating a practice grenade.

36M Throwing practice

The practice grenade is designed so that in practice, the correct throwing procedures must be used to impart a spin during the throw.

The practice grenade is constructed from the same outer body, arming cap, and safety pin as a live grenade. The body contains a wooden filler block with a hole in the center. A piece of spring steel is fixed in the hole so that the screw in the arming cap will function normally.

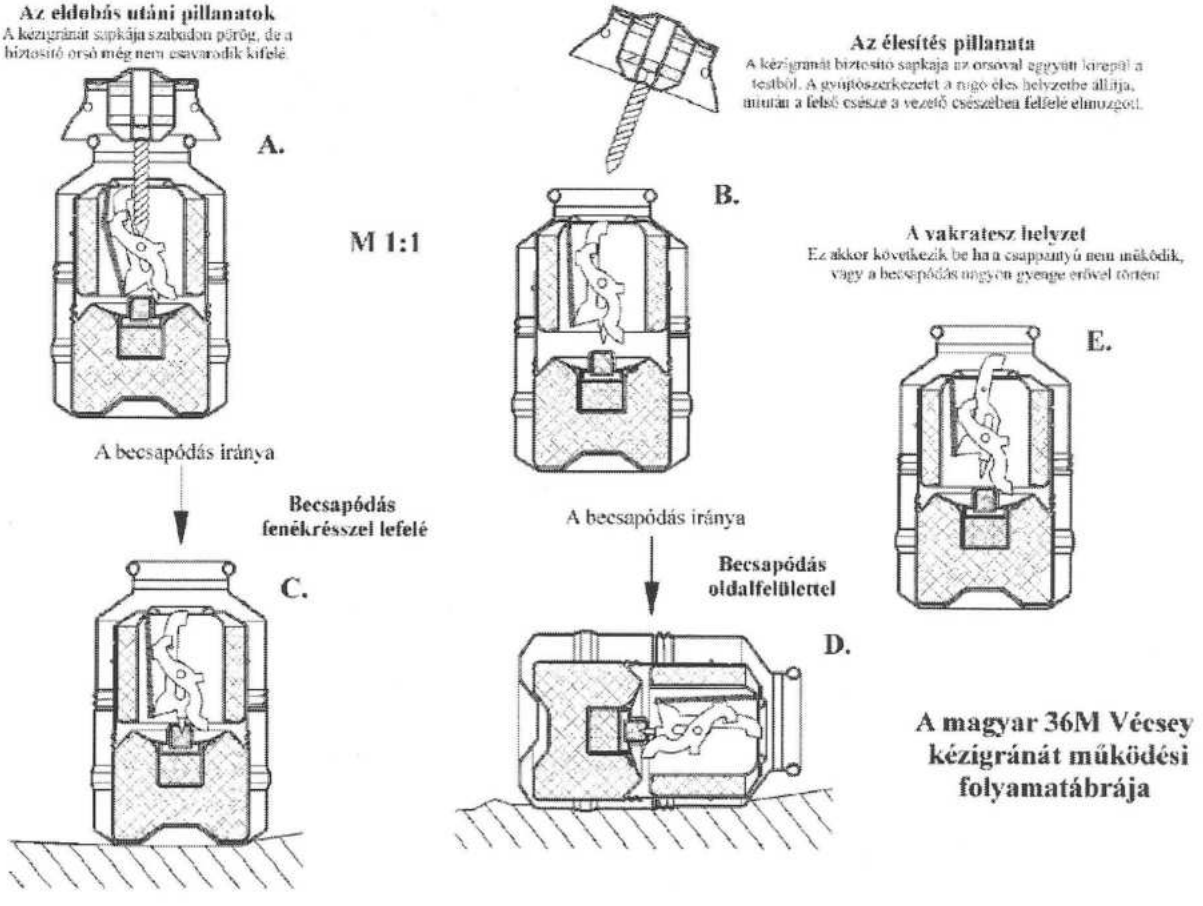


Diagram showing the action of the 36M grenade Diagram by Andras Hatala

The grenade body is black with three yellow bands denoting an inert practice grenade.

37M (Demeter)

Designed in 1937, this grenade was adopted for service in 1938 along with the 36M Vecsey.

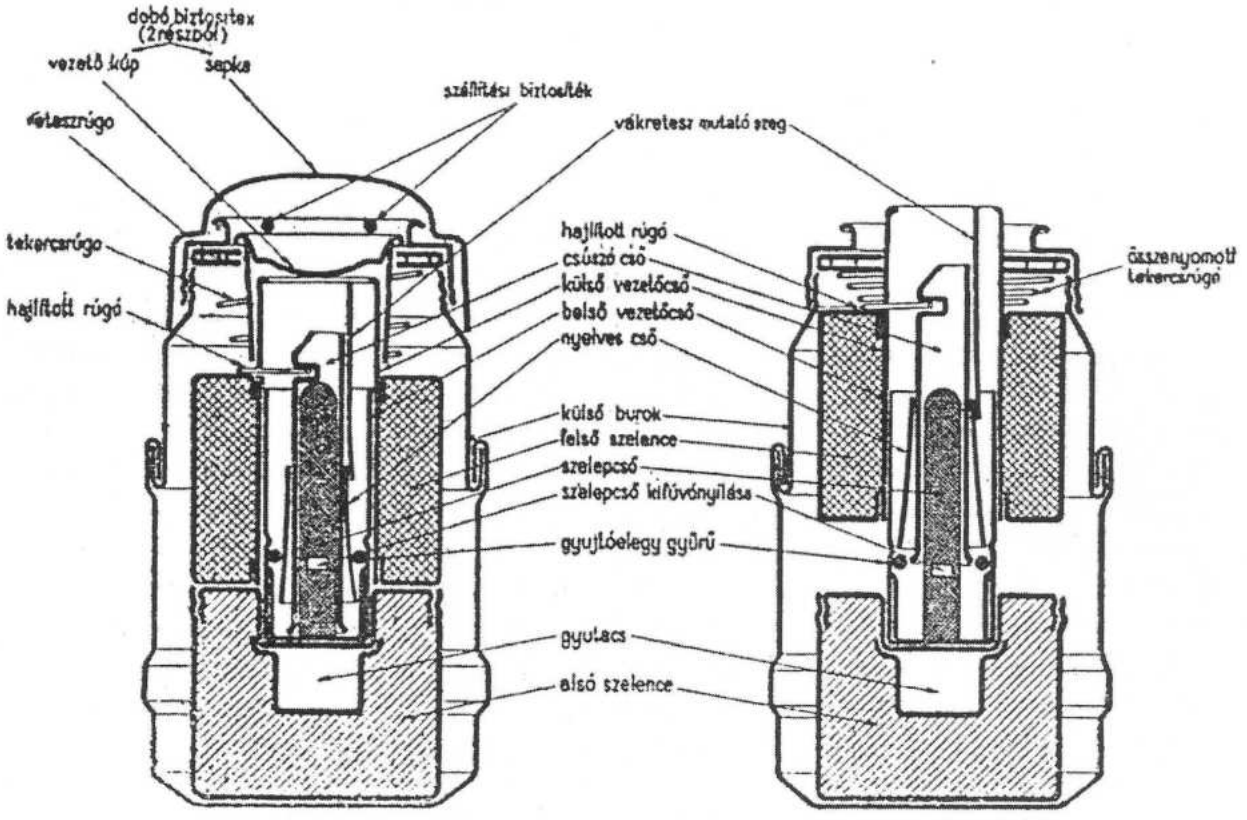
The main body is made of 0.5 mm sheet steel. The body is made in two main parts, the bottom section is basically a cup with a formed ring protruding from the body near the bottom. The upper portion is necked down and has threads formed at the top. The two parts are seamed together forming another raised band around the grenade. The two bands are likely designed to provide a good grip on the grenade. The top of the grenade is closed by a sheet metal cap that screws onto the body after the internal parts have been inserted. The top is covered by a closing cap that is held on by the safety fork. The cap has small bumps on the top that assist in gripping the grenade. The safety fork passes through holes in the closing cap and corresponding holes in the rim of the sheet metal cap. There is normally a leather pull tab attached to the safety fork.

37M (Demeter)
Photo- Andras Hatala

The internal components consist of several parts. There is a lower explosive container consisting of a cup with threading formed on the top edge. The cap is threaded to match the cup and has the inner central tube attached to the top of the cap. The detonator cup is fixed to the bottom of the cap below the tube. There is a groove formed in the tube approximately one third up from the bottom. The groove creates a raised ring on the inside of the tube. The upper explosive container is a cup with the outer central tube mounted through the centre. The ignition tube is filled with a compound that will burn slowly when exposed but after ignition will explode if contained. The ignition tube is mounted onto a cup that fits into the inner central tube. There are two ignition ports near the bottom of the tube. The closing tube fits over the ignition tube. A thin tube, cut to form wings, fits over the closing tube. The bottom portion of the wings are coated with a friction compound. A friction ring fits that is coated with friction compuond fits into the inner tube. A large spring is attached to a sheet metal ring. The last component of the internal components is a driving cone that fits through the top of the grenade.

When assembled the lower explosive container has the detonator cup fixed to the bottom of its cap. The ignition tube is fitted into the inner tube with the closing tube over it. The friction ring fits into the inner tube below the raised ring formed in the inner tube. The upper explosive container is fitted into the body with the outer tube fitting over the inner tube. The spring and ring are then placed on top of the upper explosive container with the spring down. The sheet metal cap screws onto the top of the body holding all the internals in place. The driving cone then fits through the hole in the top of the grenade pushing down on the parts holding them together at the bottom of the grenade. The closing cap is then fitted onto the top of the body and the safety fork inserted. When in place the safety fork passes over the driving cone holding it in place.

For use, fingers of the throwing hand must hold the closing cap on when the safety fork is removed. When the



grenade is thrown, it must be thrown so that it rotates end over end in flight. The centrifugal forces on the internal components force the upper explosive container to move away from the lower container and compress the spring in the top of the grenade. As it moves away, it pulls the winged tube and closing tube up with it. The winged tube with friction compound coating moves over the friction ring which is prevented from moving by the raised ring in the inner tube. This causes the friction compound to flash creating a flame. The flame enters the ignition ports and ignites the compound within. The closing tube moving up exposes the ignition ports ensuring the compound burns slowly. Upon impact, the force of impact and the spring reasserting itself, force the upper container to move down toward the lower container. At the same time the closing tube is forced down closing the ignition ports. The buildup of pressure from the enclosed burning compound causes it to explode into the detonator causing the detonator to fire and ignite the main explosive filling.

1939a M

1939aM

TYPE- Incendiary
WEIGHT- Varies with filling
DIAMETER- 75-77 mm
LENGTH-180 mm
FILLING- Varies
IGNITER- Chemical
FUZE DELAY- None
DETONATOR- None

This is a Hungarian designed incendiary bottle used during the Second World War by both the Hungarians and Germans. Likely used mostly as an anti tank weapon it would also have other applications.

The bottle is a specially designed bottle with an igniter pocket in the bottom. The igniter pocket is about 25 mm W X 50 mm L X 10 mm D. The top of the bottle has a large mouth with large threading on the outer surface. An aluminum cap with a washer that will withstand the filling without deterioration seals the bottle after filling. The bottles are found in various colours of glass, green, brownish green, and clear have been noted. Another variation is a clear bottle with a long neck. No specific information as to a different designation has been found for this variation.

1939aM Incendiary bottle and carrying case

The ignition system consists of two thin glass ampoules containing a compound that reacts when exposed to the air. It is not necessary for both ampoules to break and the contents mix to cause ignition. The ampoules are contained within rubber sleeves and then fixed into the cavity in the bottom of the bottle with a wax-resin mixture. They are then covered by a red ribbon material glued in place.

There is a sheet metal carrying case for the bottles lined with corrugated cardboard to provide shock resistance. There is a thick pad at the bottom of the case to protect the ignition ampoules. The case has a wire hinge on one side and on the opposite side a belt hook and wire catch. The wire catch is attached to the bottom half of the case and clips onto a lug attached to the lid. The belt hook is riveted to the bottom half. The carrying case is painted green and has a corrugated appearance. The case is 107mm diameter and 193 mm high.

I believe the bottles are issued unfilled and are filled by the user with whatever flammable filling is available, likely thickened or plain gasoline would be the most common. For use in temperatures below 10 degrees C. the filling used was benzene.

When thrown at a tank, upon impact the bottle would break spreading the contents. At the same time at least one of the ignition ampoules would break exposing the contents to the air. The contents would react with the air causing a flame that would ignite the main filling of the bottle.

42M

Adopted on October 4, 1943 this grenade remained in production until the late 1980's and in service until 1995. Initially designed as an offensive grenade a fragmentation sleeve (58M) was developed in 1958 to adapt it for use as a defensive grenade.

42M

TYPE- Offensive/Defensive
WEIGHT- 344 gm/744 gm
DIAMETER- 51 mm
LENGTH- Head- 75 mm
Total 194 mm
FILLING- 120 gm TNT
IGNITER- Percussion
FUZE DELAY- 3.5-4.5 sec.

The explosive head is constructed of sheet steel. The top end has large threading formed into it, the base is slightly larger in diameter and has interior threading formed into it. The detonator well is centrally located in the base of the head. Threading in the mouth of the detonator well allows the handle to screw onto

the head. The handle is mainly constructed of wood with an adapter at one end to screw into the head, the other is covered by a sheet metal cap. A small ring is attached to the bottom of the handle. Both the adapter and cap are also part of the igniter mechanism that is completely contained in the handle. The mechanism has a movable tube, which is held back by two coil springs attached to the end and finally to the end cap of the handle. There is a bump formed in the central tube by punching from the outside of the tube. A striker is contained within the central tube that is held in place by an axis pin. The axis pin fits through slots in the side of the tube which allows the tube to move without the striker moving. The safety pin fits through the handle about 1 inch from the adapter and forms a positive block preventing the striker from moving and blocking it from striking the percussion cap. The detonator assembly fits into the open end of the central tube. The detonator assembly consists of the detonator, delay element, and a percussion cap.

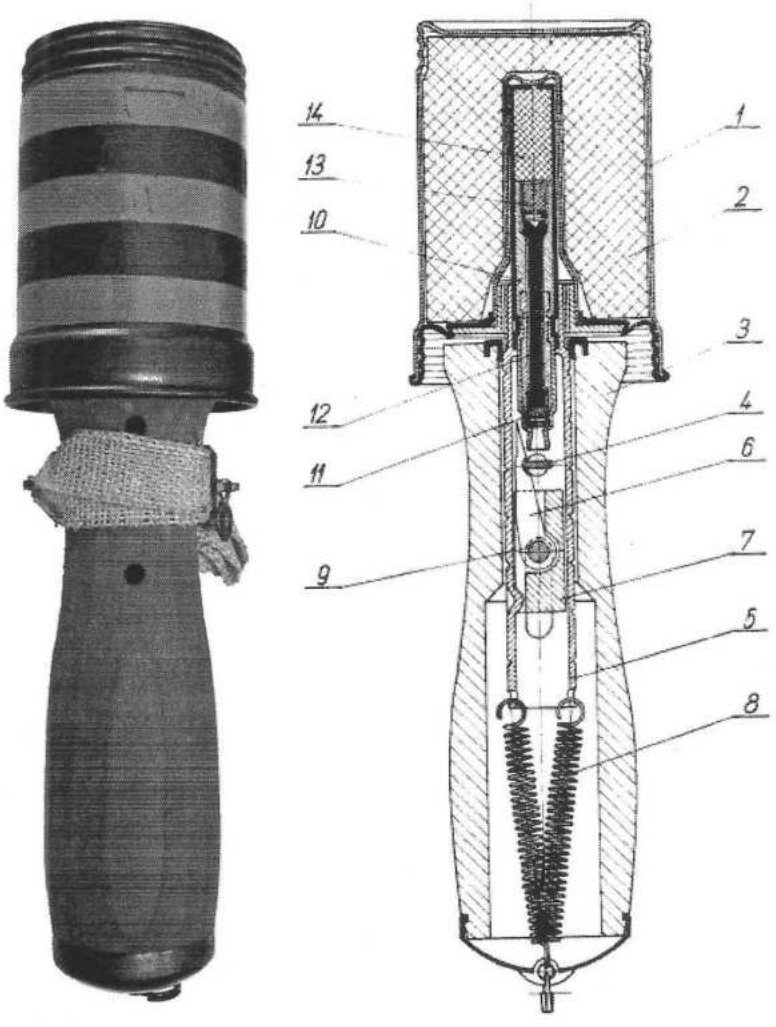
The early versions used during WWII had a slightly different handle. It was somewhat fatter than the post war grenades and did not have the sheet metal cap on the bottom of the handle.

The threading on the head allows several heads to screw together to form a small demolition charge. Up to three heads will explode using the single detonator of the grenade, if more than three heads are used, a detonator must be inserted every three heads. The fragmentation sleeve when used screws onto the head utilizing the threading at the top to retain it in position.

For use, pull the safety pin. Removal of the safety pin allows movement the central tube and releases the firing pin. During the motion of throwing, the head moves away from the handle drawing the central tube with it and tightening the springs. As the tube moves up the bump in the tube causes the firing pin to rotate into the firing position. Once the grenade is released the springs assert themselves drawing the tube and head back toward the handle. As the head moves back it forces the primer to hit the firing pin. The primer fires igniting the delay element. The delay element burns down until it reaches the detonator that fires causing the main explosive filling to explode.

The grenade body is black overall with three red bands indicating an explosive grenade.

This grenade could be used with a trip wire by securing the grenade in place and attaching the wire to the small ring on the bottom of the handle.



42M
Photo- Andras Hatala
1- Steel body, **2-** Explosive filler, **3-** Wooden handle, **4-** Safety pin, **5-** Centre tube, **6-** Striker, **7-** Block, **8-** Spring, **9-** Axis pin, **10-** Detonator assembly housing, **11-** Primer, **12-** Delay element, **13-** Detonator, **14-** Booster

42M Practice Grenade

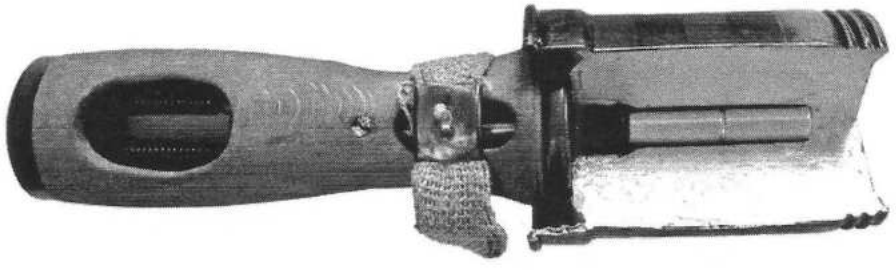
The practice grenade is constructed the same as the live version but has no explosive content. It may be fitted with a practice fuze. The grenade body is black overall with three blue bands.

42M Throwing practice

This version has the same outward appearance as a live grenade but has no internal components. It is weighted to match the live grenade. The grenade body is black overall with three yellow bands indicating a dummy grenade.

Rubber Throwing Dummy

There is a solid rubber throwing dummy for this grenade. Made in the basic shape of the live grenade and weighted to match. The throwing dummy appears to have no markings.



42M Instructional
Photo- Andras Hatala

42M Instructional Grenade

There is an instructional version of the 42M. The grenade has the head sectioned and parts of the wooden handle cut out in two places so the mechanism can be seen. The grenade is painted with the markings of the live grenade, three red bands around the uncut portion of the head.

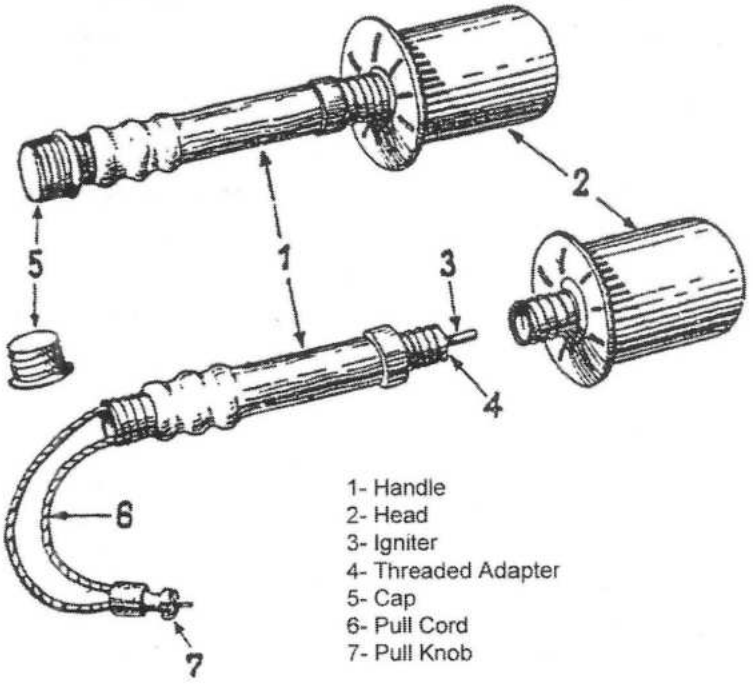
43M

This smoke grenade was adopted for service in about 1943.

The head is constructed of sheet metal in a conventional cylindrical form. The base is crimped onto the main body. A threaded socket to fit the handle is attached to the centre of the base. There are eight elongated emission holes evenly spaced around the socket. The head is filled with a Berger mixture. The handle is made of wood with

43M Smoke

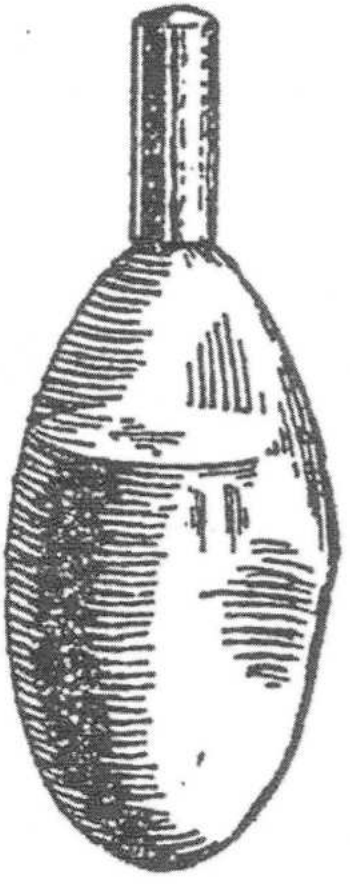
TYPE- Smoke
WEIGHT- 900 gm
FILLING- 510 gm Berger mixture
IGNITER- Friction
FUZE DELAY- 3 sec.



1- Handle
2- Head
3- Igniter
4- Threaded Adapter
5- Cap
6- Pull Cord
7- Pull Knob

threaded metal adapters at both ends. The top adapter is designed to screw into the socket in the head and the bottom adapter to accept a cap. A friction igniter contained within a sheet metal housing fits into a hole drilled lengthwise through the centre of the handle. The pull cord attached to the friction igniter runs to the bottom of the handle and has enough length that it will drop out when the cap is removed. A pull knob adds some weight to the bottom end of the cord to assist in the cord dropping out and to provide a firm gripping point. There is a flash igniter attached to the top of the friction igniter. When the handle is screwed into position the igniter protrudes well into the filling in the head. At the bottom end of the handle a cap holds the cord in the handle until ready for use. The handle has corrugations turned into it near the bottom to identify it as a smoke grenade in a similar manner as the German Nebelhandgranate 39.

For use, grasp the handle in the throwing hand, remove the cap with the other hand and take a firm grip on the pull cord. Pull the cord sharply and throw immediately. This causes the friction igniter to ignite the delay fuze. After a delay of 3 seconds the delay fuze burns into the flash igniter. The flash igniter then fires into the main filling and ignites it. The smoke produced by the burning Berger mixture escapes through the eight emission holes in the bottom of the head. Once ignited the grenade will emit smoke for up to 100 seconds.



43M Irritant

43M Irritant Smoke

This is nothing more than a rugby ball shaped glass bottle with a nipple at one end. The bottle is filled with a black liquid mixture containing sulphurtrioxide and another chemical. This was the standard filling of all Hungarian Artillery Smoke during WWII.

The filling is very reactive with the moisture in the air. The reaction is violent and produces significant amounts of heat. In enclosed areas the smoke produced is an irritant but is unlikely to be deadly.

43M Irritant
TYPE- Irritant Smoke WEIGHT- 710 gm

In practice the grenade would be carried in the same type container used for the 39a M Incendiary grenade.

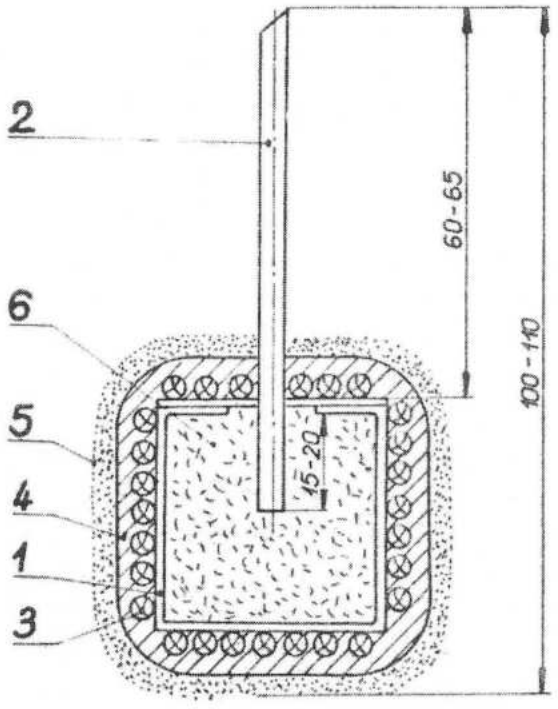
There is no preparation required for use, simply throw or drop the grenade onto the target. Upon impact, the grenade will break, exposing the contents to the air. Once exposed, the contents react with the moisture in the air producing an irritant smoke.

50M

This is a training simulator used to simulate the explosion of a grenade. Introduced in about 1950.

50M
TYPE- Practice/Simulator LENGTH- approx 55mm FILLING- 36 gm black powder IGNITER- safety fuze

The body is constructed from a small cardboard box filled with black powder. The top has a 5 mm hole with a time fuze fitting through into the filling. The edges of the box are sealed with adhesive tape and then wrapped with hemp twine in both directions. The entire grenade is then covered with tar (bitumen) and sawdust.



50M
1- Cardboard box, 2- Fuze, 3- Hemp Twine,
4- Tar/Bitumen, 5- Sawdust, 6- Filling

For use the fuse must be ignited by match and the simulator thrown immediately. After a delay the fuze burns into the filling causing it to explode.

Coloured Smoke 1950's

This coloured smoke grenade was used in the 1950's; unfortunately the proper designation is unknown. It was available in red, green, blue, yellow, and violet smoke colours. It is no longer in service.

Coloured Smoke

TYPE- Smoke, Signal
FILLING- Smoke Composition
IGNITER- 35M Friction
FUZE DELAY- 2.5-3.5 sec.

The main body is cylindrical and made of wrapped and glued paper. Both ends are closed by wooden plugs. The lower plug is solid, the upper plug has a central hole for the igniter and six smaller radial holes to allow smoke escape. The 35M friction igniter is held in the central hole by a rubber plug and has a small piece of delay fuze attached. The delay element gives a delay of 2.5 to 3.5 seconds before it ignites the main filling. A distance ring is placed on top of the grenade with the hole in the ring filled with felt wadding. The distance ring and felt wadding protect the friction igniter in transit. A press fit paper cap then closes the top of the grenade. The friction paper is placed on top of the cap and the entire top then covered by a thin paper seal.

For use, pull off the paper seal and retain the friction paper, pull off the press fit cap allowing the distance ring to fall away to expose the friction igniter. Rub the friction paper across the igniter and immediately place or throw the grenade. The igniter flashes into the delay fuze igniting it. After a delay of 2.5 to 3.5 seconds the fuze burns into the main filling and ignites it. The burning filling produces coloured smoke that escapes through the six holes in the top wooden plug.

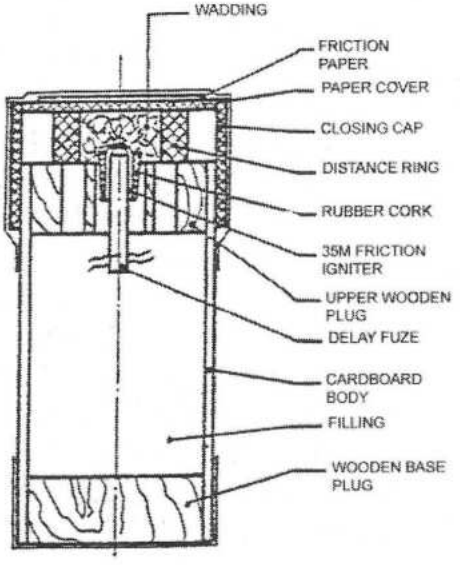
62M

This grenade is designed as a training item to simulate battlefield sounds. It is possible it was also used as a flashbang type grenade.

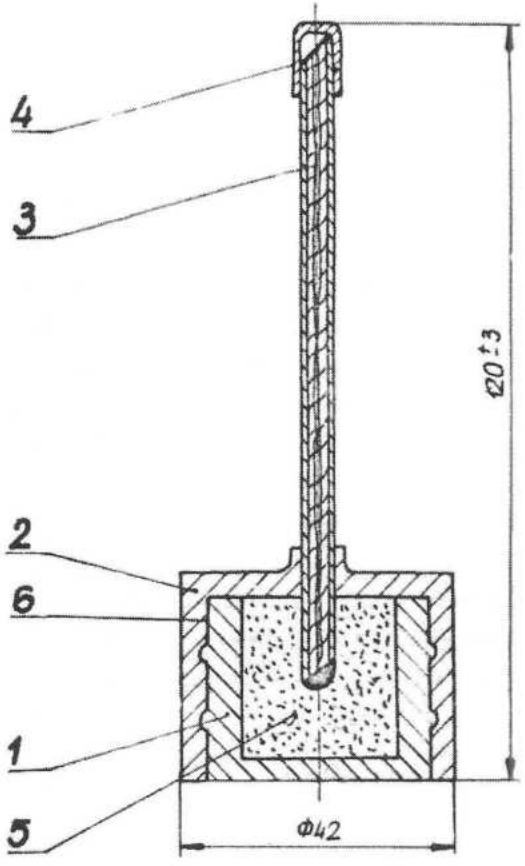
62M

TYPE- Sound
WEIGHT- 48 gm
DIAMETER- 42 mm
LENGTH- 31 mm
IGNITER- 35M Friction
FUZE DELAY- 7 sec.

The body is cylindrical and is constructed in two parts from soft PVC. The bottom section contains the filling. The top section fits over the bottom section and is held in position by two rings around the bottom section that fit into two grooves in the top section. In addition the body is sealed by an adhesive composition. The top section has a hole in the top to fit a 100 mm piece of safety fuze.



Coloured Smoke



62M

1- Lower PVC body, 2- Upper PVC body, 3- Fuze, 4- Protective cap or friction igniter, 5- Filling, 6- Seal

The fuze fits down into the filling leaving 85 mm protruding and is again sealed with an adhesive compound. The end of the fuze is closed by a 35M friction igniter. The igniter consists of an aluminum cap with friction compound. A small piece of friction paper is supplied with each grenade. Early versions of the grenade may not be fitted with the igniter but were instead ignited by match.
Each grenade is packed in a plastic bag containing a separately closed piece of friction paper.

For use, remove the grenade from the plastic bag and retain the friction paper. Scratch the friction compound on the igniter with the friction paper to ignite the fuze. Immediately throw the grenade. The fuze provides a delay of 7 seconds.

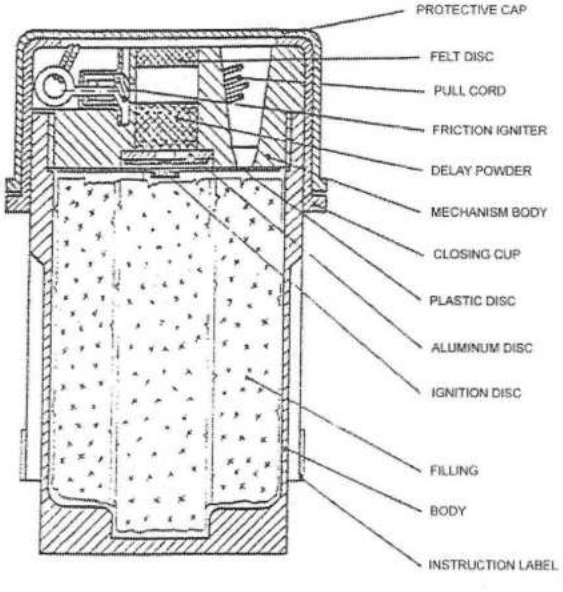
Smoke or Tear Gas Grenade

This grenade was introduced in the early 1980's to replace the earlier coloured smoke grenades. It is in use by both the Army and Police. It is capable of use as a coloured smoke grenade producing red, green, yellow, white, blue, or violet smoke, or can be filled with a tear gas mixture.

The body is made of plastic in either white, yellow, or brown. The body is cylindrical with the outside knurled and is internally threaded at the top to match threading on the igniter mechanism. The filling is held in a plastic bag that is then inserted complete into the body. The igniter mechanism also acts as the top closing plug. There is a central hole in the mechanism that contains delay powder and has a friction igniter mounted on the side so that when operated it flashes into the delay powder. The top of the hole is closed by a felt wad. A 10 cm cord is attached to the ring of the friction igniter. Conical holes surround the central hole to allow the gas or smoke to escape. A plastic disc with ignition discs attached to the centre closes the bottom of the mechanism. The joint between the body and igniter mechanism is sealed by a closing cap that has a large hole in the top to allow access to the igniter. A protective cap fits over the closing cap closing the hole and protecting the igniter.

The body colour has nothing to do with the fillings, a pasted paper label giving technical data and instructions for use is attached to the lower body also identifies the filling and colour of smoke.

For use, remove the protective cap, grasp the ignition cord, and pull. Immediately throw the grenade. After a delay period, the delay powder ignites the ignition discs which in



Smoke or Gas Grenade

90M (Tabak)
Photos- Andras Hatala

body, which may have reduced its effectiveness. A simple fuze mechanism utilizing a safety lever is screwed into the top. Filling was TNT.

The grenade was painted olive green with markings in black on the main body portion. In addition there were two light green bands painted around the body.

turn ignite the main filling. The burning compound quickly melts the plastic disc opening the emission holes and allowing the smoke or gas to escape.

90M (TABAK)

90M (Tabak)

TYPE- Offensive/Defensive
FILLING- TNT
IGNITER- Percussion

This appears to the first attempt at developing a replacement for the 42M. Designed by Mechanikai Muvek RT in Budapest in about 1990. The grenade was not adopted for service.

It was designed as a combination offensive/defensive grenade. The main body is a sheet metal container that has some threading formed into the bottom end of the body. A fragmentation sleeve could be fitted over the body and held in place by screwing onto the bottom threading. When attached, the fragmentation sleeve does not cover the entire

92M NF

This was a development of Nike-Fiocchi in 1992-93. There were a number of body styles and manufacturing methods tested in an attempt to develop the least expensive and simplest method of manufacturing the grenade bodies. The 92M grenade is the result of those tests. The 92M was not adopted as a service grenade due to the fuze mechanism, however the body was a successful design and carries on in the later grenades.

92M NF

TYPE- Fragmentation
FILLING- 39 gm A-IX-1
IGNITER- Percussion, delay

The body is made of olive green plastic and has ribs formed on the body and a

92M NF
Photo- Andras Hatala

93M NF

This is a development from the 92M, in fact a modified body with new fuze mechanism. The fuze mechanism shows a great deal of influence from Arges and may in fact be manufactured by Arges. This is the current defensive/fragmentation grenade in use with the Hungarian Army.

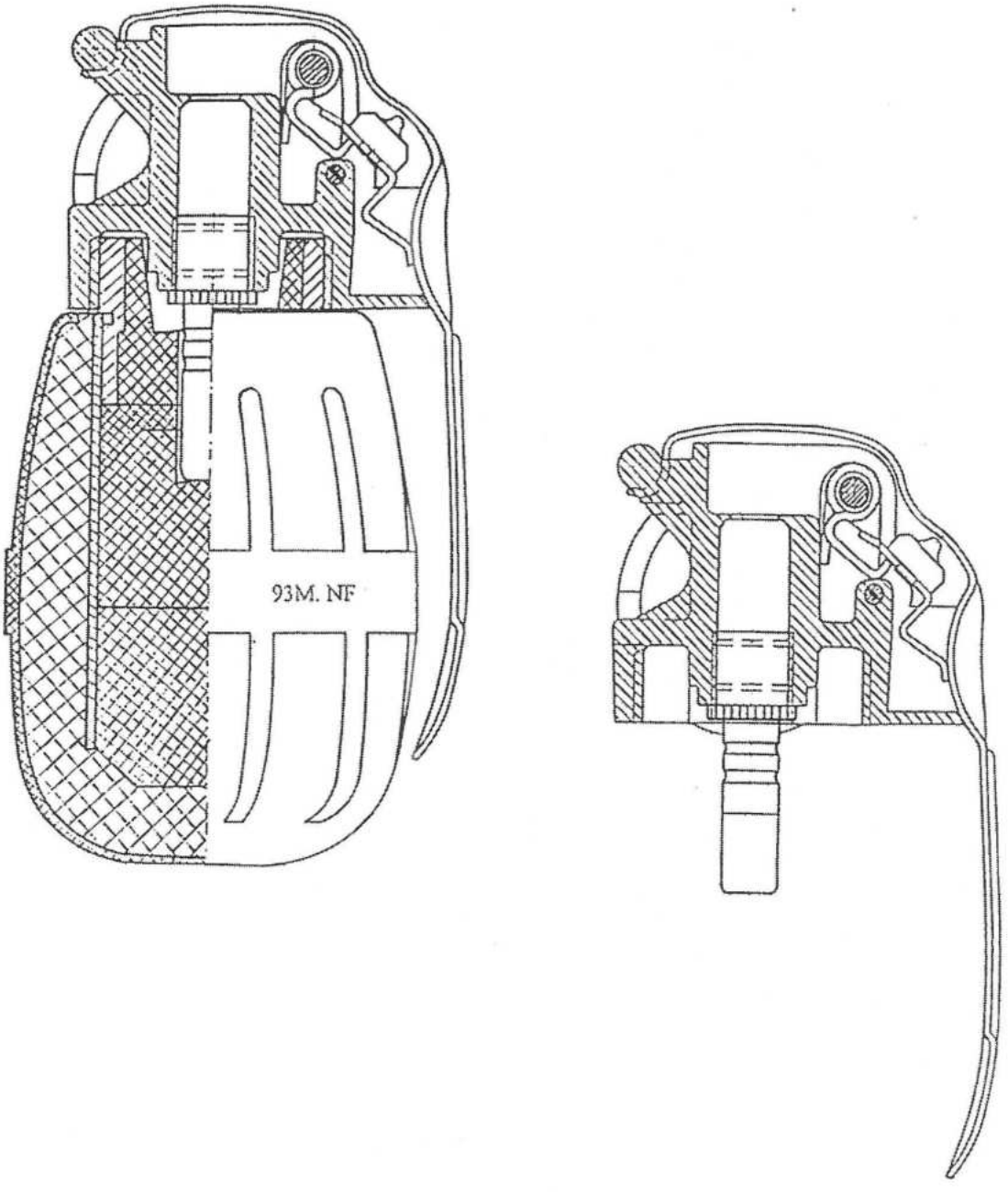
The body is basically the same as that used with the 92M. There is a metal central tube containing the explosive bursting charge. The tube protrudes from the top of the body and is threaded to accept the fuze mechanism. A plastic matrix plug containing fragmentation balls covers the top of the explosive container. The explosive container is surrounded by a plastic matrix containing fragmentation balls. The grenade contains about 4600 fragmentation balls 2.4 to 2.6 mm in diameter. The entire body is then covered by an outer plastic cover. The cover has vertical ribs molded onto it, both to give a firm gripping surface prominent center seam with markings embossed on it. The body has a central metal tube that contains the explosive bursting charge. The central tube is surrounded by a plastic matrix with steel balls embedded to provide the fragmentation effects. The outer plastic casing then covers the entire assembly. The fuze mechanism appears to be a fairly standard percussion type time delay of Hungarian design.

93M NF

TYPE- Fragmentation
WEIGHT- 455 gm
DIAMETER- 49.6-51.6 mm
LENGTH- 103 – 104 mm
FILLING- 39.1 gm A-IX-1
IGNITER- Percussion, fuze delay
FUZE DELAY- 3.2 – 4.2 sec.

The grenade is olive green with embossed markings on the centre seam. The igniter mechanism is also olive green but the safety lever is painted red.

93M NF
Photo- Andras Hatala



and to aid in identification at night. There is a wide horizontal central band molded onto the body in addition to the vertical ribs. The fuze mechanism screws onto threading formed on the top of the central tube with the detonator fitting through a hole in the plug.

The grenade is made of dark green or black plastic. The fuze mechanism is olive green. The designation is molded onto the central band around the grenade.

93M NF VEGY

This practice grenade is outwardly very similar in shape and construction to the live grenade. A large tube runs the length of the body top to bottom with the bottom open to release the gases and smoke produced by the

practice charge. The body is reusable by replacing the igniter mechanism that includes the practice charge.

The body is blue to indicate a practice grenade, the igniter mechanism is a light green plastic material denoting a practice munition.

93M NF VGY

93M NF VEGY
TYPE- Practice
WEIGHT- 450 gm
DIAMETER- 49.6-51.6 mm
LENGTH- 103 – 104 mm
FILLING- Practice charge
IGNITER- Percussion, fuze delay
FUZE DELAY- 3.2 – 4.2 sec.

This is a solid rubber molded representation of the 93 M NF grenade used for throwing practice. The body is made of a light blue rubber to closely match the size, shape, and weight of the live grenade. It is molded with the same type ribs as are on the live grenade. There is a removable safety pin so the exact same actions that are required for a live grenade may be practiced with this one.

This is very similar to the 96 M TGY grenade and really only differs in the ribs on the body. This difference between the two rubber dummies indicates that night identification training of the two types can be accomplished with training grenades.

93M NF VEGY
Photo- Andras Hatala

96M NF

This is the offensive counterpart to the 93M fragmentation grenade. Fully adopted in 2003 this is the current offensive grenade in Hungarian service.

96M NF
TYPE- Offensive
WEIGHT- 182-186 gm
DIAMETER- 48mm
LENGTH- 102 mm
FILLING- 39 gm A-IX-1
IGNITER- Percussion
FUZE DELAY- 3.2-4.2 sec.

The body has no ribs on the outside to differentiate it from the fragmentation grenade. There is a central metal tube containing the explosive charge that is surrounded by a plastic matrix. An outer plastic shell then covers the body. The central tube protrudes from the top of the body and is threaded to accept the fuze mechanism. The fuze mechanism is an Arges design that may in fact be manufactured by Arges and supplied to be mated with the Hungarian designed body.

The grenade overall has a slightly pebbled finish in dark olive green.

96M NF
Photo- Andras Hatala
Note the partially unscrewed igniter mechanism showing protruding central tube.

96M NF TEGY

This is the practice version of the 96M. The central tube goes entirely through the body and is open at the bottom to allow the gases and smoke from the exploding practice charge to escape. The body is reusable by replacing the igniter mechanism that also contains the practice charge.

The body is blue and the igniter mechanism is light green.

96M NF TEGY
Photo- Andras Hatala

96M NF TGY

This is a solid rubber molded representation of the 96. M. NF grenade used for throwing practice. The body is made of a light blue rubber to closely match the size, shape, and weight of the live grenade. It is molded with the same smooth body as on the live grenade. There is a removeable safety pin so the exact same actions that are required for a live grenade may be practiced with this one.

96M Screening Smoke

TYPE- Screening Smoke
WEIGHT- 450 gm
DIAMETER- 65mm
LENGTH- 131mm
IGNITER- Friction
FILLING- 370 gm
DELAY- 3-4 sec.

This is very similar to the 93M VGY grenade and really only differs in having a smooth body without ribs. This difference between the two rubber dummies indicates that training in identification of the two types at night can be accomplished with training grenades.

96M Screening Smoke

Nike-Fiocchi is currently producing pyrotechnics for the Hungarian Military as well as hand and rifle grenades.

The 96M Screening Smoke grenade is constructed of a sheet metal cylindrical casing with a friction igniter mounted in the centre of the top. It is filled with a mixture of hexachlorethane and zinc powder. There are emission holes located in the top of the body.

96M Screening Smoke
Photo- Nike-Fiocchi

96M Coloured Smoke
Photo- Nike-Fiocchi

The grenade is marked by a yellow pasted paper label with black markings giving the manufacturer, type, designation, lot number and date of manufacture.

For use, unscrew the plastic cap on top of the grenade and pull the friction fuze. This ignites a delay element that burns for 3-4 seconds before igniting the main filling. Once ignited the grenade will produce smoke for 150-180 seconds. The grenade produces a thick cloud of white/grey smoke that is normally used for screening troop movements. In confined areas the smoke has a toxic effect.

96M Coloured Smoke

TYPE- Signal, Smoke
WEIGHT- 180-250 gm
DIAMETER- 65mm
LENGTH- 131mm
IGNITER- Friction/Percussion/Electrical
FILLING- 110-180 gm
DELAY- 3-4 sec.

96M Coloured Smoke

Nike-Fiocci also produces Signal Smoke grenades for the Hungarian Military.

These grenades are constructed the same as the screening smoke grenades but can also be ignited electrically. It also appears they can be fitted with a normal type percussion igniter with a safety lever. They are filled with a mixture of Potassium Chlorate and a colouring agent. The amount of filling varies with the different colours. There are at least four emission holes located in the top of the grenade.

The grenade is produced in a number of colours including red, yellow, green, blue, purple, and white smoke. The colour of the label indicates the colour of smoke produced.

Polish Grenades

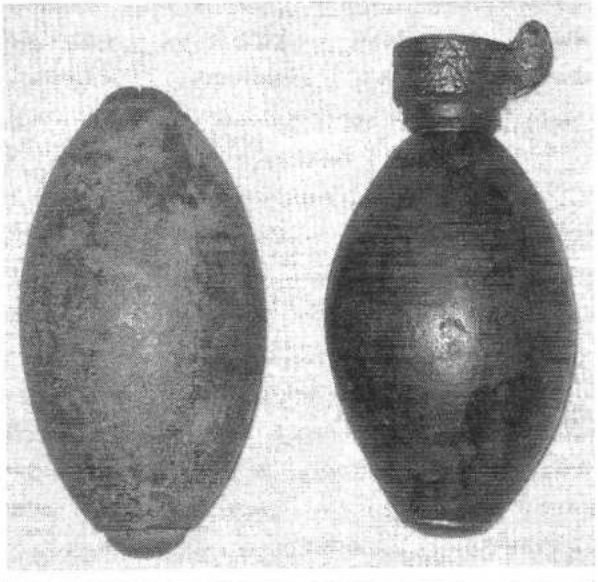
In the 15th and 16th Centuries, Poland was a major European power. In 1572 Poland entered a long period of decline culminating in its partition between Russia, Austria, and Prussia in 1772, 1793 and again in 1795. Poland did not become a sovereign state again until January 1919. In 1939 Poland was again partitioned between Germany and Russia. After WWII, Poland again became a state under Soviet influence. In 1989 the communist government was overthrown with Poland becoming a liberal democracy. Poland joined NATO in 1999.

Polish use of grenades prior to becoming a sovereign state after WWI is unknown. When the Polish army was formed after WW I there were some 338,000 hand grenades of various types in army depots. The grenades on hand at the time were varied and included, British Mills bombs, French F1 and OF 1, Austrian Stick grenades, Russian M1914 and M1915 rifle grenades, and German Sthgr. 17 and Eihgr. 1917Na. The Polish army used these as an interim measure and instituted a research program to decide on grenades to be manufactured domestically. Most stocks of the foreign grenades were used up in a war against Russia in 1920-21.

Initially the German M1917 stick grenade (wz. Z.17) and M1917Na egg grenades (wz. O.16) were produced in Poland beginning in about 1919. These were decided on because of their simplicity to produce and they could produce them without obtaining a manufacturing license from Germany.

In 1923 a decision was finally made on some Polish designed modifications to other grenades that had been included in the research. The committee decided on the French F1 and OF 1 bodies but with Polish designed fuzes. The first fuze was the AC. 23, designed in 1923 by A. Cierpinski of the "Granat" company, to fit the wz. O. 16 bodies.

In 1923 they began to produce the Z-23 and O-23 grenade bodies that were copied from the French grenades. In 1924, to fit the new bodies, the AC.23 fuze was modified and redesignated AC.24. The modification involved larger threading and replacing the ignition element with a detonator because the new bodies were filled with high explosive. It was soon discovered that the AC. 24 fuzes were susceptible to moisture so they were modified again with a rubber ring and leather disc to stop the moisture problems and redesignated AC.25.



"E" Grenade
Throwing Dummy on left, Practice grenade on right
Photo- Grzegorz Cholewa

With the reduction in supplies of the earlier wz. O.16 grenades and the large quantities of the AC. 23 fuzes available a new defensive grenade was developed in 1926/27, the wz. KC, basically a smaller version of the wz. O.23.

There were quantities of the British No. 16 Mk. I grenades obtained that were modified to use the AC 23 fuze mechanism and used for training. In Polish service these were known as the "E" grenade. Two types were used, a sand filled model without fuze for throwing practice, and a modified grenade using the AC 23 fuze mechanism. The modified grenade had no explosive filling and was used as a practice grenade.

During this period, the Polish Forces also used numbers of French grenades for other purposes. The Mle1916 Incendiary grenade, Mle 1918 AT grenade, Mle 1916 Gas, Viven Bessiere, and various VB signals are all listed in Polish manuals of the time.

In 1929 the "Granat" company submitted a new fuze that was safer to use, this was the Gr. 29. The new fuze had threading to match the Z.23 and O.23 bodies. During production of the fuze over the next two years several modifications were made resulting in a new designation, Gr. 31. This became the standard fuze of the Polish army until WWII. When the new fuzes were fitted to the standard grenade bodies the grenades were designated as wz. O.33 and wz. Z.33. The new fuze was so successful that in 1935 the French purchased 310,000 fuzes and in 1937 purchased a production license for the new fuze. The French designated it as the M1935BG fuze and variations of it are still in use today.

During the period 1928 to about 1937, the Polish grenade company sold huge number of fuzes and grenades to various countries including Romania, Argentina, Greece, Sweden, France, Mexico, and Uruguay. The grenades and fuzes supplied to Mexico and Uruguay were most likely destined for Spain.

The Polish also sold large numbers of grenades through other countries to the forces fighting the Spanish Civil War. It appears that they used this as an opportunity to dispose of obsolete stocks like the wz. O.16. Since the VP17 fuzes originally used with the grenades were no good and the AC.23 fuzes obsolete and in short supply, they modified the Gr. 31 fuzes by reducing the thread size and replacing the detonator with a black powder ignition element. This fuze was designated GRN.31 and was only used on the wz. O.16 bodies. The grenades supplied with the new fuzes were designated as wz. O.18.

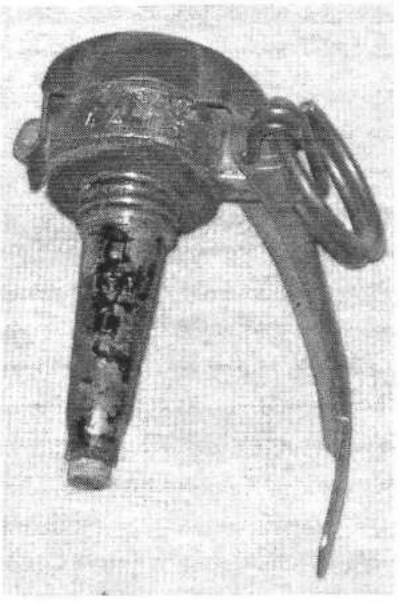
When Poland was invaded by Germany and Russia in 1939, grenade production appears to have ceased. During the first months of occupation, the Polish resistance movement took hold and began clandestine production of grenades and other weapons. There were a number of grenades types produced, the most notable being the ET. 40 and R.42. Production continued throughout the war.

After the war, Poland fell under Soviet influence and adopted most Soviet designs of grenade including the F1, RG 42, RPG 43 and RPG 6. Poland possibly continued to produce its own grenades as well. NATO recognition manuals list the wz. O.33 grenades as being used by Poland well into the 1980's and many still list it. It is unlikely that the grenades were in use much past WWII since Soviet supplied grenades were plentiful. Poland was also one of the only Warsaw Pact countries to use rifle grenades such as the PGN-60 and F-1N 60.

In more recent years, Poland has adopted newer grenades such as the RGO 88 and RGZ 89.

Polish Fuze Mechanisms

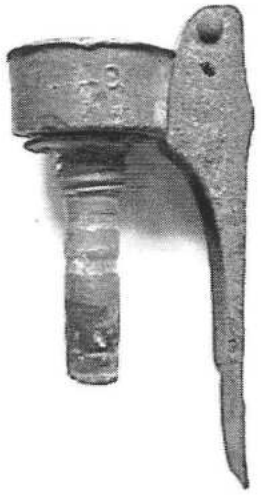
VP 17- This was a Polish copy of the German M 1915 Friction igniter. Designed for use with low explosives this is an igniting type fuze. The diameter of the threading is 11 mm.



wz. 16B Fuze mechanism
Photo is the French produced fuze

wz. 16B- This is a Polish copy of the French M1916B Percussion fuze. Initial supplies were French produced. When the French fuzes were exhausted the Polish produced their own. Designed for use with low explosives this is an igniting type fuze. The diameter of the threading is 15 mm.

wz. AC 23- This fuze was designed by A. Clerpinski and was the first of the Polish designed fuzes. Adopted in 1923 it had serious problems and was quickly replaced. Designed for use with low explosives this is an igniting type fuze. The diameter of the threading is 11 mm.



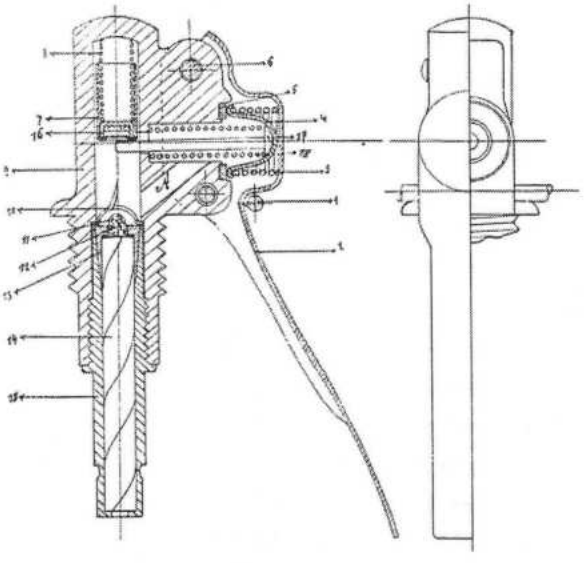
wz. AC 23 Fuze
Photo- G. Cholewa

wz. AC 24 - Adopted in 1924 this fuze was a modification of the wz. AC 23 to fit the wz. Z. 23 and wz. O. 23 grenades that have 15mm threading. These fuzes were susceptible to moisture and some had a deformation to the needle springs that caused misfires. This was a detonating fuze used with high explosive fillings.

wz. Kr. 24- Training version of the Wz. AC 24. This grenade has a small black powder charge in place of the detonator. The body material is steel. Diameter of the threading is 15 mm.

wz. Kr. 24/28- This is a modification of the KR 24 that uses brass for the body material rather than steel.

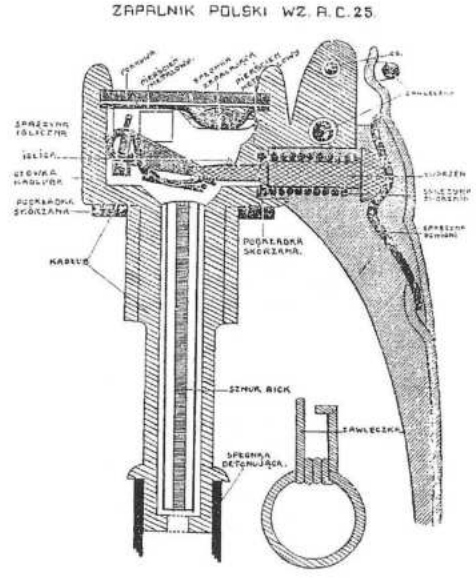
wz. AC. 25- This is an improved version of the wz. AC 24 that corrected the problems with that fuze. The addition of a rubber ring and a leather washer solved the moisture problems. This was a detonating fuze used with high explosive fillings. Diameter of the threading is 15 mm. A slightly modified version designed for use with the CAF grenade has a different safety lever.



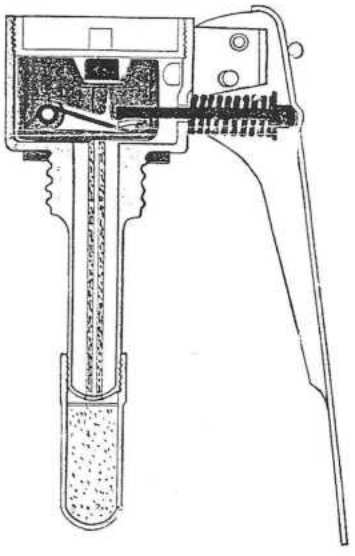
wz. GR 28 Fuze
Diagram from Patent #11363

wz. Gr. 28- This was a prototype fuze mechanism designed by Edward Lopatto. It does not appear to have been adopted by Poland but grenades with this fuze have been found on the battlefields of the Spanish Civil War indicating that substantial numbers were produced.

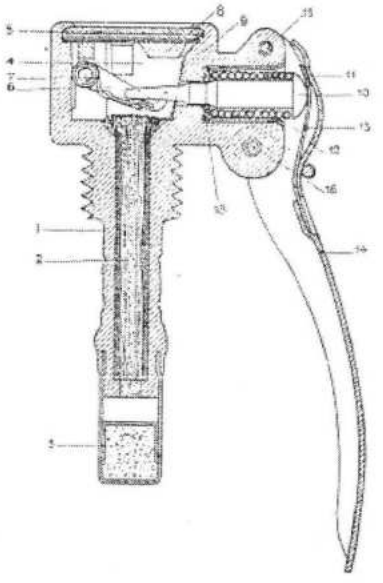
wz. Gr. 29- This is again an improvement on the previous fuze which greatly improved its reliability. This was a



wz. AC 25 Fuze



wz. Kr 24 fuze



wz. Gr 31 Fuze

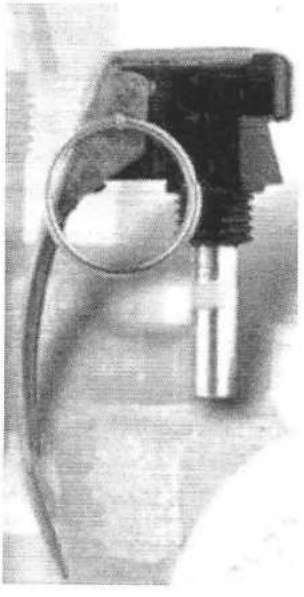
detonating fuze used with high explosive fillings. Threading is 15 mm.

wz. Gr. 31- From 1929 to 1931 production improvements in the wz. Gr. 29 resulted in the wz. Gr. 31 fuze mechanism. This was a detonating fuze used with high explosive fillings. The threading is 15 mm. This remained the main Polish grenade fuze for many years. In 1935 France purchased some 310000 fuze mechanisms and in 1937 purchased a production license from Poland and adopted the fuze as the M1935.

wz. GRN. 31- A modification of the previous fuze to fit the smaller bodies and low explosive of the wz. 16 grenades. Used only on grenades supplied to Spanish forces during the Spanish Civil War. The addition of the letter "N" to the designation served to identify this fuze for the use only with the wz. 16 bodies. This is an igniting fuze for use with low explosives. The threading is 11 mm.

UZRGM- This fuze is identical to the Russian model with the exception of markings.

UZGR- This is a new design of fuze mechanism that can replace or be used in place of the UZRGM fuse mechanism. It is a conventional style utilizing a safety lever. Little information is currently available. The main body is made of plastic, with a metal safety lever. These fuzes are manufactured by Mesko SA.

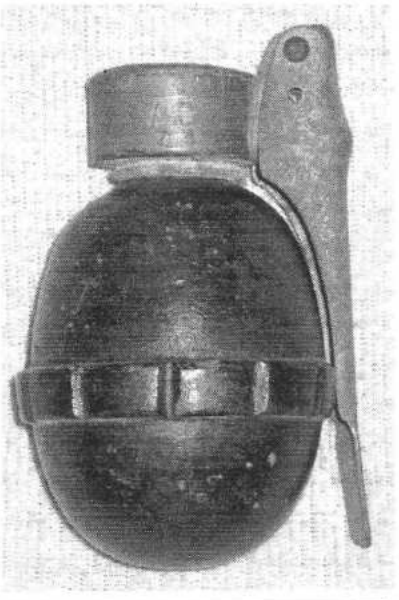


UZGR Fuze
Photo- Mesko SA

Granat Obronny wz 16/wz 18

One of the earliest grenades produced by Poland was the wz 16, a direct copy of the German Eihandgranate M1917Na. Initially captured German stocks were used.

The body made of cast iron in the shape of an egg. There is a segmented band around the centre of the body resembling a fragmentation band but which is in fact designed to improve the gripping surface of the grenade. The top of the grenade has an 11 mm threaded hole that is used to fill the grenade then act as the socket for the fuze mechanism. The friction fuze, VP 17, was also a copy of the German fuze. Problems developed with the VP 17 fuzes in storage resulting in them being replaced in 1923 with a new fuze. The new fuze, designed by A. Clerpinski, was designated as the AC 23.

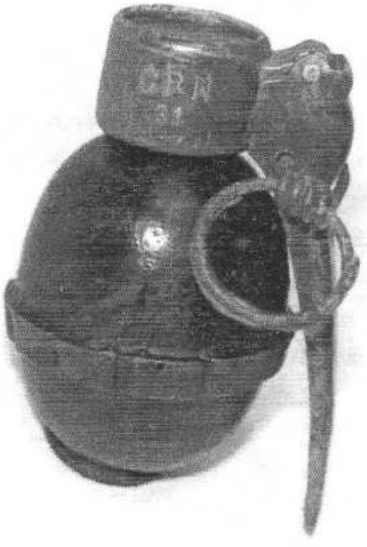


wz. O. 16 grenade with AC 23
Photo- Grzegorz Cholewa

In 1936-37 Poland sold large numbers of grenades to the Republican forces during the Spanish Civil War, including the wz 16. This was most likely a good way to clear out Polish stocks of obsolete grenades. For use in Spain the fuze mechanisms were changed to the more modern wz. Gr 31 type. Some modification was required to the fuze mechanism to fit the smaller body of the grenade. Modifications included reducing the threading to 11 mm and replacing the detonator with an ignition element. These fuzes were designated wz. GRN. 31 to indicate the fuzes were to be used only with the wz-16 grenades. Grenades fitted with the new fuze were then designated as wz-18.

wz. O. 16 / wz. O. 18

TYPE- Fragmentation
WEIGHT- 318 gm.
DIAMETER- 55 mm
LENGTH- 65 mm w/o fuze
FILLING- 30 gm, black powder
IGNITER- VP 17, AC 23, GRN 31
FUZE DELAY- 5 sec.



wz. O. 18 with GRN 31 fuze
Photo- Jesus Ornia

Granat Zaczepny wz 17

wz. Z. 17

TYPE- Offensive
WEIGHT- 800 gm
DIAMETER- 61 mm
LENGTH- 355 mm
FILLING- 300 gm
IGNITER- Friction
FUZE DELAY- 5 sec.

This grenade was adopted along with the wz 16 Defensive grenade. It is a copy of the German Sthgr 17. Production began in 1919 and ceased in 1923 with the adoption of newer more effective grenades.

The Polish friction fuze differed slightly from the German designed fuze having an improved safety. Filling was either Dynamite or Picric Acid.

wz. Z. 17

Photo is actually a German Sthgr. M1917

Granat Zaczepny wz. 23

Initially France supplied quantities of this grenade. It was in fact a French OF1 with the M1916B percussion igniter. It was later copied and produced entirely in Polish factories.

The body is thin sheet steel made in two halves, top and bottom. The bottom is simply a cup; the top half has a threaded igniter socket formed at the top. The two halves are seamed together in the middle forming a raised ring. The body is filled with Cheddite leaving a detonator pocked formed in the explosive beneath the igniter socket. Initially the French M1916B fuze was utilized, designated as wz. 16B by Poland. In 1924 the fuze was changed to the wz. AC 24. In 1925 the fuze was again changed to the improved wz. AC 25.

wz. Z. 23

TYPE- Offensive
WEIGHT- 330 gm
DIAMETER- 60 mm
LENGTH- 88 mm
FILLING- Cheddite
IGNITER- wz. 16B, wz AC 24, or wz AC 25
FUZE DELAY- 4 sec.
EFFECTIVE RADIUS- 8-15 metres

wz. Z. 23
Photo is a French OF1

This grenade relies on the blast from the explosion to cause casualties over a fairly small area. The thin body produces very light fragments that do not travel far. These grenades are designed for use in the offense.

Granat Obronny wz. 23

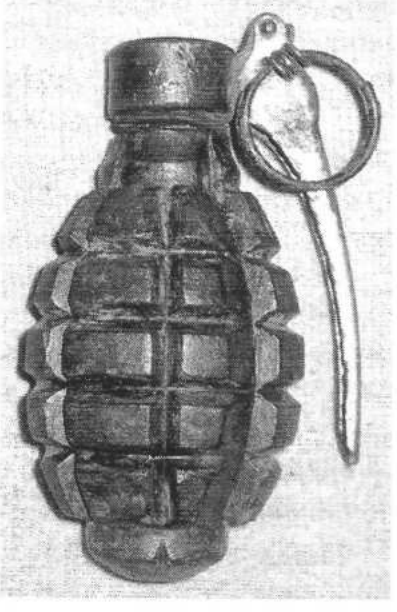
This grenade was initially acquired from the French. It was in fact a French F1 fitted with the M1916B fuze mechanism. Once stocks of the French manufactured grenades were depleted the Polish manufactured copies of the grenade.

The body is cast iron with external segmentation. The maximum thickness of the body is 7.5 mm and the minimum 3 mm. The French manufactured bodies have a filling hole in the bottom closed by a lead plug. When the Polish began manufacturing their own bodies, the filling hole was eliminated. There is a threaded hole in top to allow filling and to fit the igniter mechanism. A sheet metal detonator well is screwed into the top hole to seal it after filling. The fuze mechanism is then screwed into the detonator well. The main explosive filling is Cheddite, but other explosives may have been used.

The grenade was initially fitted with the French designed fuze (wz. 16B), either supplied by the French or manufactured in Poland. It was replaced by a Polish design in 1924 the wz. AC.24. There were problems with the Polish fuze being susceptible to moisture and in some cases had a deformation of the needle springs causing misfires. In 1925 a modernized design was accepted for service and designated wz. AC.25.

wz. O. 23

TYPE- Fragmentation
WEIGHT- 600 gm
DIAMETER- 57 mm
LENGTH- 88 mm
FILLING- Cheddite, 60 gm.
IGNITER- wz 16B, AC 24 or AC 25
FUZE DELAY- 4 sec.



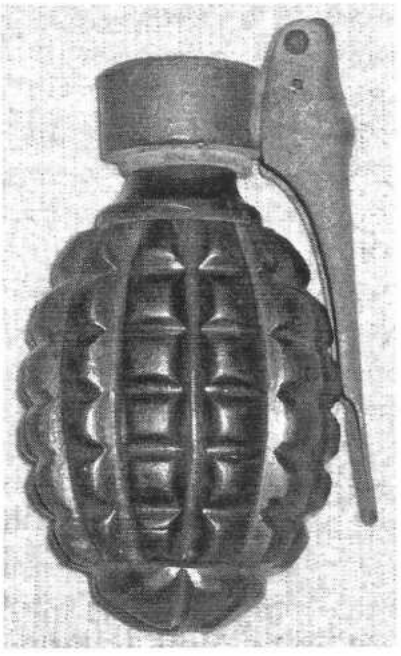
wz. O. 23 with AC 24
Photo- Grzegorz Cholewa

The grenade is painted black, no other markings are noted on the body.

Granat Obronny wz. KC

wz. O. KC
TYPE- Fragmentation
WEIGHT- 450 gm
DIAMETER- 51 mm
LENGTH- 76.5 mm
FILLING- Black Powder and aluminum, 40 gm.
IGNITER- wz AC. 23, wz. AC 24
FUZE DELAY- 4 sec.

This grenade was introduced to Polish Forces in about 1926/27. It is basically a smaller version of the standard wz. O. 23 grenade. Initially it was equipped with the wz. AC. 23 fuze mechanism and later changed to the wz. AC 24.



wz. O. KC
Photo- Grzegorz Cholewa

The body is tin plated cast iron with an 11 mm threaded hole in top. The outside of the body is segmented to aid in fragmentation and provide a good gripping surface. The bursting charge is a mixture of black powder and aluminum powder. The fuze mechanism screws into the threaded hole in top of the body.

The smaller size and lighter weight of the grenade allowed more to be carried for the same weight and the grenade could be thrown farther. Upon detonation the grenade produces a fragmentation radius of 60 to 80 metres.

Granat Reczny Cwiczebny W.C.Z. 26

W.C.Z. 26
TYPE- Practice
WEIGHT- 302 gm
DIAMETER- 60 mm
LENGTH- 85 mm
FILLING- None
IGNITER- Kr. 24
FUZE DELAY- 4 sec.

This is a practice grenade constructed to simulate the use of the Granat Zaczepny Wz. 23. The grenade was adopted for use in 1926.

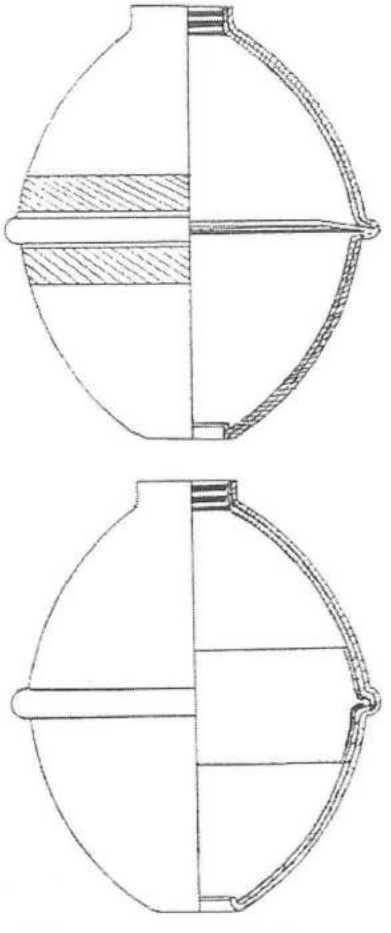
The body is constructed of sheet metal as is the live version, but the practice version has a double thickness of metal. This construction gives the grenade more weight and is stronger to withstand repeated use. The bottom of the grenade is open to allow gases and smoke from the practice fuze mechanism to escape.

The body is painted red to distinguish it as a practice grenade.

W.C.O. 26
TYPE- Practice
WEIGHT- 500 to 600 gm
DIAMETER- 60 mm
LENGTH- 85 mm
FILLING- None
IGNITER- Kr. 24
FUZE DELAY- 4 sec.

Granat Reczny Cwiczebny W.C.O. 26

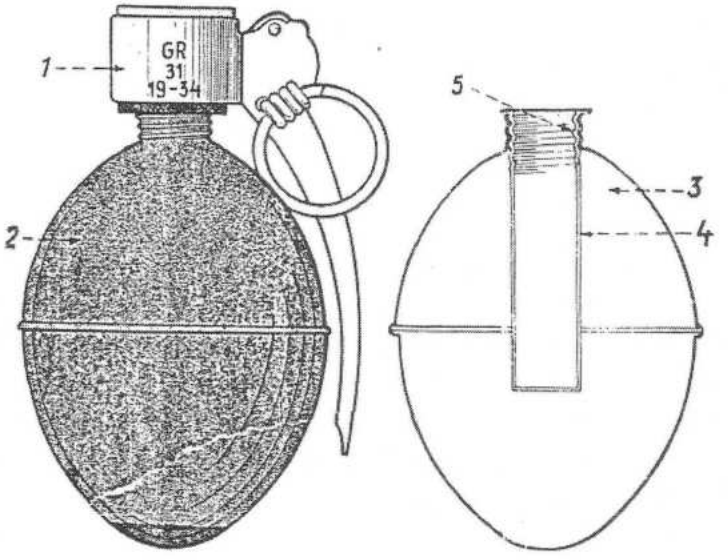
This is a training grenade very similar to the W.C.Z. 26 but simulates the weight but not the looks of the defensive "Granat Obronney wz. 23" grenade rather than the offensive grenade. The grenade was adopted for use in 1926.



W.C.Z. 26 top, W.C.O. 26 bottom

The body is made in the same manner with a double thickness of sheet metal, but this version has an additional band of iron on the inside around the centre of the body. This gives the grenade a heavier weight to better simulate the weight of the defensive grenade. The bottom is open to allow the gases and smoke from the exploding practice charge to escape.

The body is painted red to distinguish it as a practice grenade.



wz. Z. 33

Granat Zaczepny wz. 33

This is a modification of the wz. 23 introduced in about 1933. The body is virtually identical, only the addition of an aluminum detonator well, filling, and the igniter mechanism have been changed. Quantities of this grenade were sold to Republican forces during the Spanish Civil War.

wz. Z. 33

TYPE- Offensive
WEIGHT- 360 gm
DIAMETER- 60 mm
LENGTH- 87 mm
FILLING- 150 gm
IGNITER- wz. Gr 29 or wz. Gr 31
FUZE DELAY- 4.5 sec
EFFECTIVE RADIUS- 8-15 metres

The body is thin sheet steel made in two halves, top and bottom. The bottom is simply a cup, the top half has an igniter socket formed at the top. A detonator well is formed of aluminum sheet and screwed into the igniter socket. The two halves are seamed together in the middle forming a raised ring. The body is filled with 150 grams of Trotyl or Picric Acid. The igniter mechanism may be either the Gr. 29 or Gr. 31. The mechanism screws into the detonator well in top of the body.

This grenade relies on the blast from the exploding filler to cause casualties over a fairly small area. The thin body produces few fragments and the fragments are so light they will not travel far. These grenades could be used by soldiers in the open with little danger to themselves.

Granat Obronny wz. 33

Adopted in 1933 this grenade remained in Polish service at least until 1940. Nato recognition manuals have had it listed, normally incorrectly as Gr 31, as an in service or obsolescent grenade up to the very latest issues. Whether it was in fact a first line grenade after WWII is open to dispute. With the Russian occupation of Poland and subsequent rearming of the Polish Army, it seems that they would more likely have been armed with the Russian grenades.

wz. O. 33

TYPE- Fragmentation
WEIGHT- 600 gm
DIAMETER- 57 mm
LENGTH- 112 mm
FILLING- Trotyl, 60 gm
IGNITER- wz. Gr 29 or wz. Gr. 31
FUZE DELAY- 4.5 sec
EFFECTIVE RADIUS- maximum 200 metres

The body is cast iron with external segmentation. It appears to be the same body as used with the wz 23 grenade. The maximum thickness of the body is 7.5 mm and the minimum 3 mm. There is a threaded hole in top to allow filling and to fit the igniter mechanism. An aluminum detonator well is screwed into the top hole to seal it. The Gr 29 or Gr. 31 fuze mechanism screws into

the top of the grenade after the detonator well. The grenade was initially filled with trotyl but the filling may well have changed over the years.

wz. O. 33
Photo- Ed Strazdes

For use, remove the safety pin while holding down the safety lever. Throw the grenade, when the grenade is thrown the safety lever rotates up releasing a spring loaded pin. When the pin is ejected from the fuze, the strikers are free to rotate under spring pressure to hit the percussion caps and ignite the delay fuze. The delay fuze burns for about 4.5 seconds before reaching the detonator causing it to explode. When the detonator fires, it causes the main filling to detonate bursting the body of the grenade. As with most grenades of this type, the body bursts into a few large fragments, some medium and small fragments and cast iron dust. The larger fragments may travel up to 200 metres.

Granat B1

B1

TYPE- Fragmentation
DIAMETER- 56 mm
LENGTH- 98 mm
IGNITER- wz. Gr. 31
FUZE DELAY- 4.5 sec.

The B1 grenade is an interesting case. The grenade body may or may not be of Polish manufacture. The fuzes found with the grenade are Polish but no documentation has been found that proves the body is Polish. It was used during the Spanish Civil war indicating manufacture sometime between 1931 and 1937 at the very least. It is most likely that the body is Spanish made to fit Polish fuze mechanisms.

B1
Photo- Ed Strazdes

The body is cast iron, smooth on the outside and segmented on the inside. The inner segmentation causes the body to break up into more regularly sized fragments that if it were segmented on the outside. There is a 15mm diameter threaded hole in the top for filling and to fit the igniter mechanism. The igniter mechanism is the wz. Gr. 31. A high explosive filling is contained within the body.

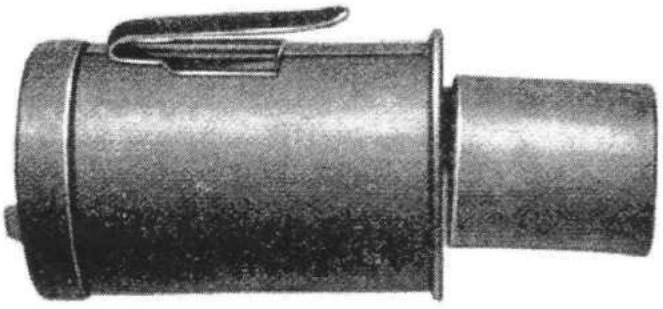
The body is marked with the designation "B1" and is normally found painted black.

Granat Dymny S

Granat Dymny S

TYPE- Smoke, Screening
WEIGHT- 575 gm
LENGTH- 160 mm
DIAMETER- 70 mm
FILLING- Smoke Composition and Bitumen

This Polish grenade was initially identified as a Russian grenade by the Germans during WWII and identified by the designation "Nebelhandgranate 362(r)". NATO identification manuals continued after the war to identify it as Russian. Perhaps the confusion comes because the Russians took captured Polish grenades into use, which were later captured by the Germans. Some information contained in NATO manuals on earlier



Granat Dymny S

grenades was taken from documents produced during WWII.

The body is sheet iron in a cylindrical form. The base is covered by a cap held on by two, possibly three clips. The other end has a crimped on end with a stem of reduced diameter in the centre. The stem contains the igniter mechanism and is covered by a locking cap. A carrying hook is attached to the side of the body. The filling is a mixture of potassium nitrate, ammonium-chloride, and bitumen (tar). No details on the igniter mechanism are known but it is likely that some type of friction igniter was used.

The grenade is painted an Olive-brown colour and has the letter "S" stamped on the end of the locking cap and on the carrying hook.

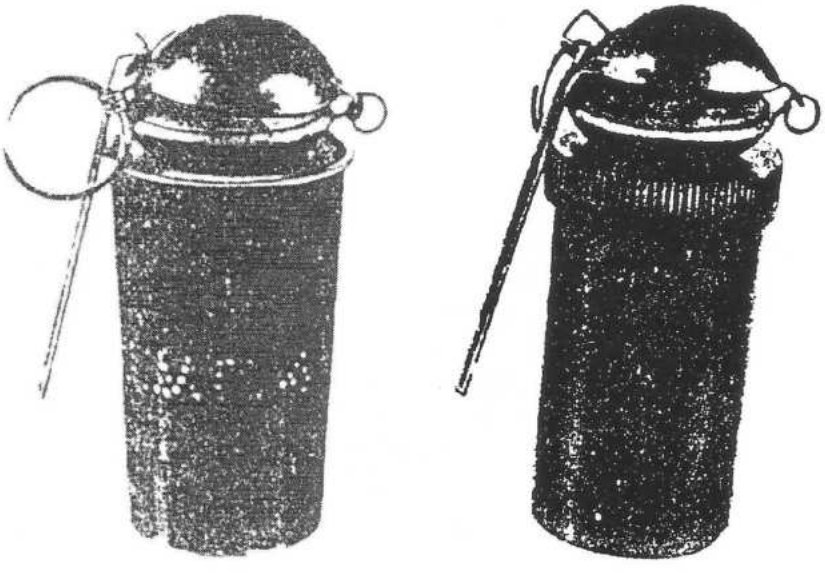
Granat Zaczepny wz. ET 40

wz. ET40

TYPE- Offensive
DIAMETER- 52 mm
LENGTH- 95 mm
FILLING- 240 gm Cheddite
IGNITER- Impact

During the Second World War, when the Germans occupied Poland, a well-organized resistance movement developed, popularly known as the "Polish Home Army". From about 1940 on, the Polish Home Army operated clandestine manufacturing facilities and producing its own grenades as well as other arms.

The first was the wz ET 40, developed from a prototype impact grenade, wz ET 38 designed by Edward Tymoszak (hence the ET in the designation). The grenade was more popularly known as the "Filipinka". The first type body is made of "ebonite" (a form of bakelite) in a cylindrical shape. The second type body is stamped from sheet steel with a cap and the igniter fitting into the cap. The igniter consists of a cone shaped body threaded on the bottom end. There is a hemispherical top. Both the firing pin and percussion caps are contained in weighted holders. A creep spring separates the firing pin and percussion cap. A safety pin also fits between the firing pin and percussion cap and is attached to the safety lever. A spring between the igniter body and safety lever is designed to help it fly off when thrown. A split pin and ring hold the safety lever onto the body. The grenade was normally filled with Cheddite that the Polish were also manufacturing but was also filled with plastic explosives obtained from the British.



ET 40 Type 1 ET 40 Type 2

When the pin is removed and the grenade thrown, the spring under the

safety lever is free to reassert itself. It aids the lever in flying off. As the lever flies off it withdraws the attached safety pin from between the firing pin and percussion cap. At this point the only thing holding the grenade safe is the creep spring between the two. When the grenade strikes the ground the firing pin is either driven into the percussion cap or the percussion cap is driven onto the firing pin depending on how the grenade lands.

The grenade initially was not marked, but when the Germans invaded Russia, the Polish began putting Cyrillic markings on the bodies to further disguise the origins of the grenades. The hope being that if the grenades were captured the Germans would think that the Russians had supplied them rather than looking for the secret production facilities.

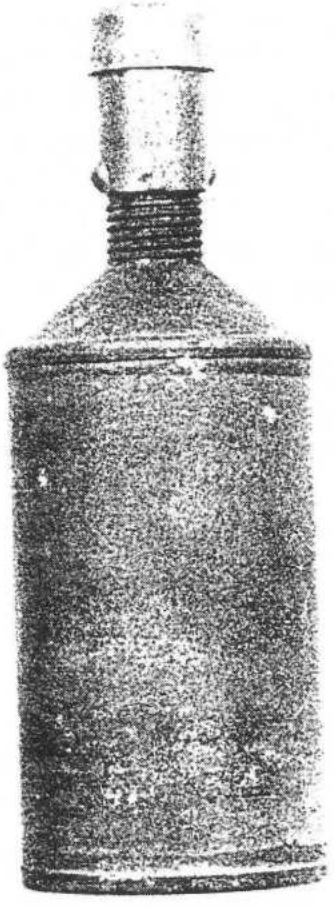
Granat Zaczepny wz. R 42

1n 1942 a simpler design of grenade began to be produced by the Polish Home Army. The grenade was commonly known as the "Sidolowka".

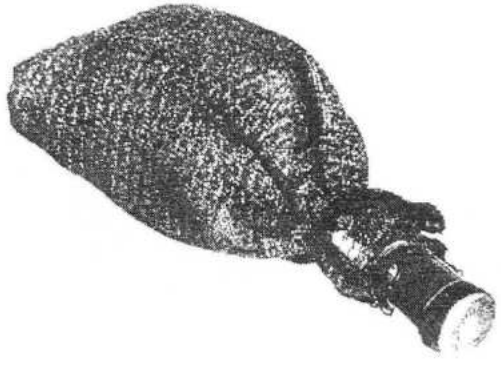
The body of the grenade was a tin normally used for "Sidol" a popular metal cleaner. This also helped to disguise the grenade. The body was normally filled with cheddite but other explosives may have been used including plastic explosives supplied by the British. A P-42 friction igniter screws into the top of the body.

The design of the fuze, with consideration given to the fact it would have to be made in clandestine facilities, was accomplished by Jozef Michalowski and Wladislaw Pankowski. The fuze body is made of a lead alloy and has a sheet metal screw top to provide a safety. A pull knob was located below the screw cap that was attached to a cord that passed through the ignition mixture. A cardboard disc covered with a friction compound was attached to the other end of the cord. A delay fuze passed through the middle section of the fuze leading down to the copper cased detonator. It should be noted that the entire fuze, including detonators were manufactured in clandestine facilities.

When the cap was removed and the pull knob pulled, the cardboard disc was pulled through the ignition mixture. This caused it to flash and ignite the delay fuze. The delay fuze burned for a period of about 4.5 seconds before it reached the detonator. The detonator would in turn cause the main filling to explode.



wz. R 42



Fabric Bag Grenade

A third type, produced during the Warsaw uprising consisted of a fabric bag filled with explosive and whatever was to hand for fragments. The fragments could be rocks, broken concrete, bolts or anything else that could be propelled by the explosive. A P-42 friction igniter was tied into the top of the bag.

There were of course other grenades produced and used by the Home Army, but these three were the main ones produced and serve as good examples of what they were able to accomplish.

wz. R 42

TYPE- Offensive
WEIGHT-
DIAMETER- 55 mm
LENGTH- 130 mm
FILLING- Cheddite
IGNITER- Friction
FUZE DELAY- 4.5 sec.

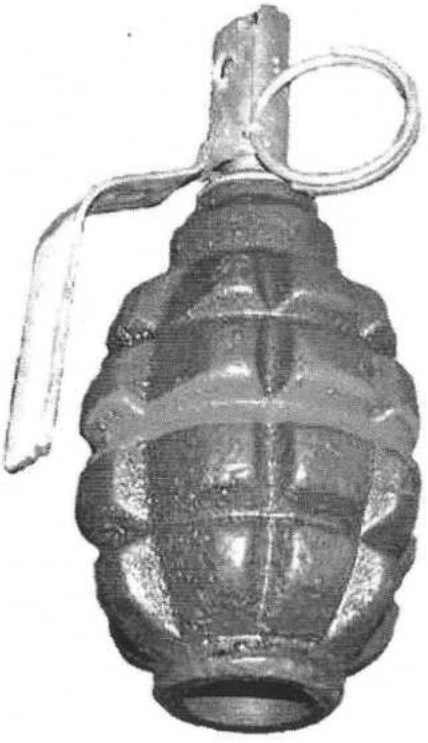
Granat Reczny wz. F-1

As with other members of the Warsaw Pact, Russian grenades were taken into Polish service. The F1 grenade is one of those. The Polish F1 is for all intents and purposes identical to the Russian models except it is produced in Poland.

Granat Reczny Cwiczebny wz. F1

The body is virtually identical to the live grenade but has a large hole in the bottom to allow the gases from the exploding practice charge to escape. It is similar in most respects to the Russian URG.

The grenade is painted olive green with a red band around the centre. Cast in markings include a "31" in a circle, but this particular marking may change. The safety lever is painted half white and is marked with a factory code and lot number. The upper portion of the safety lever has "CWICZ" stamped into it. The grenade may also be found painted black with a red band around the body.



Granat Reczny Cwiczebny wz. F1

Granat Reczny Szkolny wz F1

This is a training version used for classroom instruction. It is identical to the live grenade but is made with inert components and filling.

The grenade is painted the same colour as the live grenade but has a white band painted around the centre of the body.

F-1/N60

This grenade was one of the few rifle grenades in service with the Warsaw Pact. Poland was at one time the only country of the Warsaw Pact to supply rifle grenades to its forces.

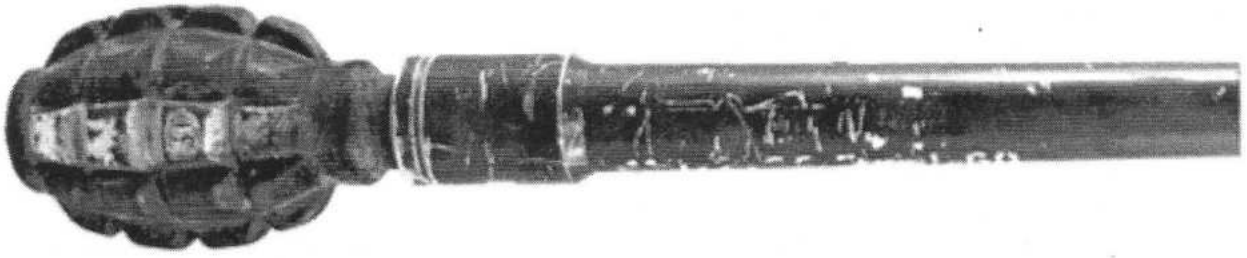
This consists of the body of an F1 grenade with a special adapter. The adapter has a large end that is threaded to accept the launching tube. The other end is a tube with a threaded portion directly below the large end. The detonator is crimped onto the bottom of the tube. The adapter screws into the grenade with the detonator projecting into the body. The launching tube has no stabilizing fins. The tube has an enlarged portion at the top with thicker walls. The enlarged end also contains the fuze mechanism that screws onto threads inside the enlarged portion. When the fuze is fitted the entire assembly is screwed onto the adapter.

The fuze consists of a body threaded to match the threading in the tube. A primer holder is mounted in the centre of the end without the threading. A striker is mounted on an inertia weight and a creep spring is fitted between the striker and percussion cap. A safety pin is fitted through the weight and into the side wall of the fuze. Another weight is fitted below the safety pin and has a small piston mounted in the centre. Below the weight is a cam block with a hole in the centre to allow the piston to protrude. The bottom of the fuze is closed by a thin disc.

The grenade is painted green and has markings in black. Markings in white on the launching tube give the designation and date of manufacture.

F-1 N-60

TYPE- Rifle, Fragmentation
WEIGHT- 630 gm
DIAMETER- 55 mm
LENGTH- 270 mm
FILLING- 45 gm
IGNITER- DC-1 Impact



F-1 N 60

When the grenade is fired, the propelling gases strike the piston at the same time as they launch the grenade off the launcher. The gases push the piston in and against the safety pin. At the same time a setback weight pushes against the ends of the safety pin. The two forces working opposite to each other cause the safety pin to break and arm the fuze. At this point the creep spring keeps the striker away from the percussion cap. When the grenade strikes the target, even a grazing strike, the weights push forward against the resistance of the spring, overcome it and allow the striker to hit the cap. The cap fires and flashes into the tube on the adapter. The flash travels down the tube until it reaches the detonator, causing the detonator to fire and ignite the main bursting charge.

Reczny Granat RG 42

The RG 42 as used by Poland is identical to the Russian manufactured grenades.

Cwiczebny Reczny Granat CRG- 42

This is a practice version of the RG42 used by Polish forces during training. It is reloadable and can be used many times.

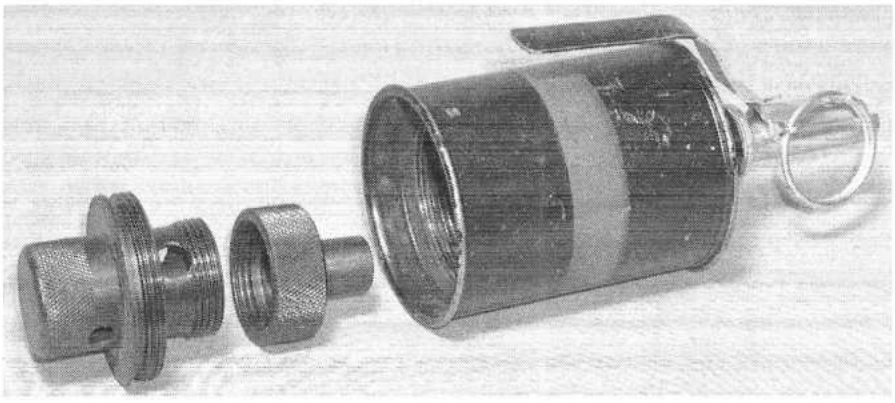
The body appears to be turned from a single piece of steel in the same shape as an RG 42 grenade. An internally threaded fuze adapter is located in the centre of the top. There are four smoke escape holes surrounding the fuze adapter. The bottom has a recessed shoulder threaded to accept the charge assembly. The charge assembly consists of a hollow closing plug with a lip that is threaded to fit the threading on the recessed shoulder in the body. A knurled projection on the bottom is used to unscrew the assembly. The top has another projection that is threaded to accept a cap. There are gas and smoke escape holes in both projections. The cap is also knurled and is threaded to fit the projection. There is a projection tube on the top that matches up to the igniter assembly on the body when the entire grenade is assembled. The practice delay fits onto the UZRGM fuze mechanism. When assembled the delay mechanism fits through the fuze adapter and down into the projection on the charge assembly.

CRG-42
Photo- Ed Strazdes

CRG-42

TYPE- Practice
WEIGHT- 427 gm without charge
DIAMETER- 57mm maximum
LENGTH- total 131mm
Body only 91 mm
FILLING- spotting charge
IGNITER- UZRGM
FUZE DELAY- 3.2 – 4.2 sec

The practice charge consists of two parts, the delay mechanism that screws into the bottom of the fuze mechanism and the spotting charge. The main charge is a smoke and flash charge that is fitted into the charge container by removing the assembly from the grenade body and unscrewing the cap. The



CRG-42 showing the grenade opened ready for loading
Photo- Ed Strazdes

charge is fitted into the assembly and the cap screwed back on. This arrangement would serve to protect the main body from damage from the practice charges ensuring it could be used many times.

The grenade is painted black with a red band around the centre. The designation is stenciled in white on the top of the grenade.

For use the grenade must be loaded with the practice charge and delay mechanism that are supplied separately. Once loaded the grenade will operate in exactly the same manner as a live grenade.

Reczny Granat Szkolny 42

This is an inert grenade used for classroom training on the RG 42 grenade. It is not used for throwing practice.

The grenade is identical to the live grenade but is made with inert components.

The grenade is painted the same colour as a live grenade but has a white band around the centre of the body. It may or may not have the word "SZKOLNY" or the abbreviation "SZKOL" or "SZK" painted on the body.

Reczny Granat Szkolny 42
Photo- Erhard Koch

Reczny Granat Treningowy 42

This is a training grenade used for throwing practice. There are no live components.

The grenade is a single piece casting made in the same shape as the RG 42. There is a threaded projection on top to accept a training fuze mechanism.

Reczny Granat Treningowy 42
Photo- Grzegorz Franczyk

The body of the grenade is black with the word "TRENINGOWY" cast into the top.

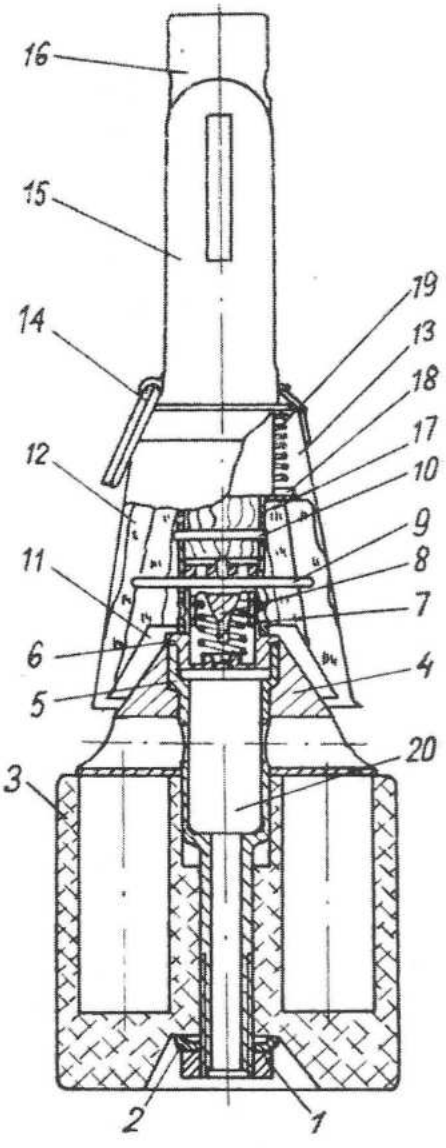
Cwiczebny Reczny Granat Przeciwpancerny 43 (CRPG-43)

This is a practice version of the RPG-43 used by Poland. They are used to practice the use of anti tank grenades and provide a realistic training environment.

The head of the grenade a single piece of rubber with lightening holes contained within. The head is held onto the handle by a nut screwed onto a hollow stem that also forms the chamber for the practice charge. There are holes in the base running from the side into the practice charge chamber. The holes in the side and the hollow stem form gas escape holes to allow the gases and smoke from the exploding practice charge to escape without damaging the grenade. With the exception of the head and base, the handle and igniter portion appear to be the same as a live grenade.

The grenade can be reloaded by unscrewing the handle assembly, resetting it, inserting a new practice charge in the chamber and screwing the handle back onto the head.

The grenade follows normal Polish practice in markings. The head is black with a red band around the bottom. The arming lever is also painted red.



CRPG-43

KGN

This is an antipersonnel grenade designed for use against personnel and lightly armoured targets.

The warhead is made of sheet steel and is somewhat pear shaped. It contains 244 steel fragmentation balls surrounding the bursting charge. The tail assembly has a launching tube with an internal diameter of 20 mm. There are four fins attached at the bottom of the tube and an impact igniter assembly attached to the top. The warhead is mounted on top of the tail assembly. The safety pin fits through the igniter mechanism.

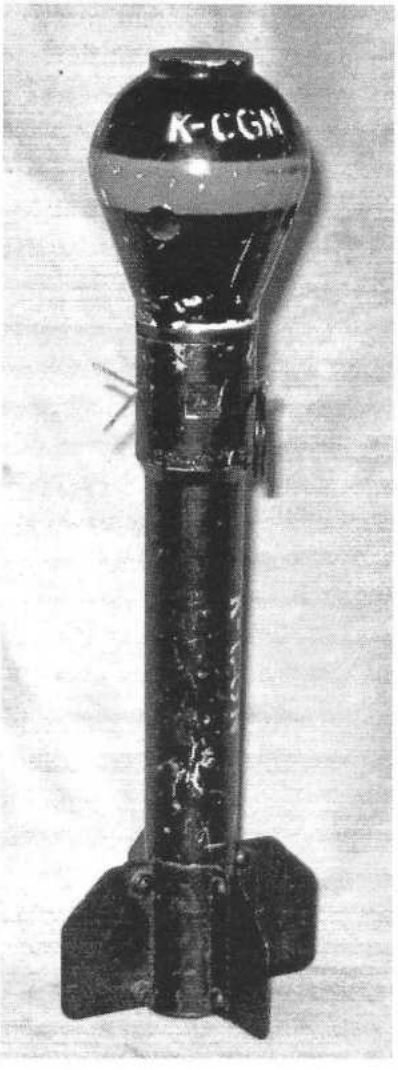
The grenade is painted green with markings in black. Markings give the designation, lot number, and manufacturing factory number.

The grenade is launched using a special launching cartridge from a rifle with a 20 mm launcher attached. When the safety pin is removed

KGN

TYPE- Rifle, Fragmentation
WEIGHT- 460 gm
DIAMETER- 60 mm
LENGTH- 240 mm
FILLING- 65 gm Trotyl/Hexogen 50/50
IGNITER- DC-1 Impact

and the grenade fired the impact igniter is armed. Upon impact the DC-1 igniter functions causing the grenade to explode.



K-CGN

K-CGN

The head is constructed of steel made to resemble the live KGN rifle grenade. The head is bored from the bottom to form an enclosed firing chamber inside the head. Four holes are drilled from the sides into the chamber to allow gases and smoke from the practice charge to escape. The launching tube is aluminum with an inside diameter of 20 mm. There are four steel fins attached to the bottom end. The fins are made in four sections that have three riveted joins. The fourth join is done with nuts and bolts so they can be replaced if necessary. The fin assembly is set into a reduced section of the tube. The fins are shorter than those on the live grenade. The upper portion of the tube has a larger diameter and contains the impact igniter mechanism. The top section is internally threaded and has a steel cup screwed down into the top portion that closes the top of the launching tube. A striker is fitted into the top and is held in place by a safety pin that fits through the side of the tube, through holes in the steel cup and through a hole in the striker itself. A creep spring fits on top of the striker. The top is closed by an adapter threaded to match both the top of the launching tube and the threading in the head of the grenade. The adapter has a hole through the centre for the striker point and a half moon cartridge retaining lip on the top.

For use the grenade must first be loaded with the practice charge. Remove the head and ensure the igniter mechanism is correctly assembled. Insert a practice cartridge on the top of the adapter ensuring it engages in the retaining lip. Screw the head back onto the tube. The grenade is then ready for use. For use, slide the grenade over a spigot launcher, and ensure the rifle is loaded with a launching cartridge, not ball ammunition. Pull the safety pin and fire the rifle. The gases from the launching cartridge propel the grenade off the spigot. The creep spring in the igniter ensures the striker does not hit the primer in the practice charge during flight. When the grenade impacts the target, the weight of the striker overcomes the resistance of the spring and allows the striker to fire the practice charge.

K-CGN

TYPE- Practice
DIAMETER- Head- 53 mm
Fins- 75 mm
LENGTH- 245 mm
FILLING- Practice charge
IGNITER- Impact

The entire grenade is painted black. There is a 0.5 inch red band around the head and white markings giving the designation. The designation is also printed on the launching tube as well as the lot number containing the date of manufacture. Stamped markings are located on the igniter mechanism housing giving the lot number and date of manufacture.

KGN Sk

This is an inert model used for classroom training. It is constructed exactly the same as a live grenade but has inert components. The grenade is painted green with a white band around the head, other markings are in black.

CGN

This is not really a rifle grenade; but is in fact part of an artillery training device. It is fired from a rifle clamped

into a special mount that is fitted with artillery sights. The sights would have been specially calibrated to match the capabilities of the projectile. It could be used on smaller ranges to practice laying an artillery piece on target. The rifle would be fired to test the accuracy of the lay. It is an inexpensive method of practice considering the cost of artillery ammunition.

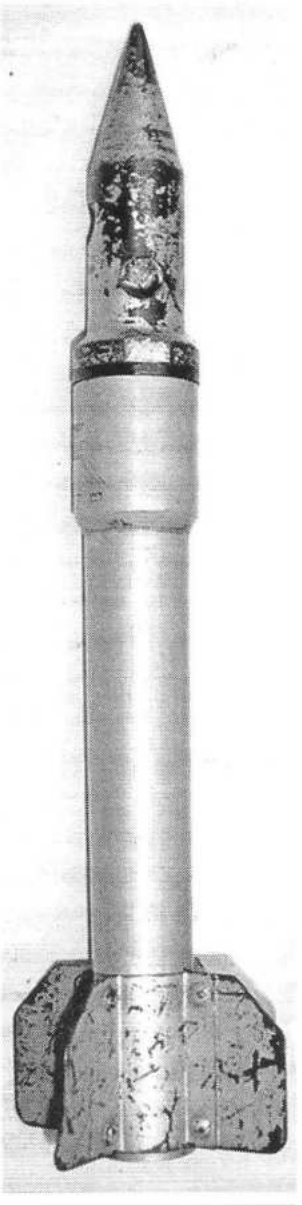
The head is pointed and has a number of holes in it designed to let the gases and smoke from a spotting charge to escape. The projectile uses a tail assembly that is similar to that used on with the K-CGN practice grenade. The launching tube is aluminum with an inside diameter of 20 mm. There are four steel fins attached to the bottom end. The fins are made in four sections that have three riveted joins. The fourth join is done with nuts and bolts so they can be replaced if necessary. The fin assembly is set into a reduced section of the tube. The upper portion of the tube has a larger diameter and contains the impact igniter mechanism. The top section is internally threaded and has a steel cup screwed down into the top portion that closes the top of the launching tube. A striker and creep spring fit into the steel cup. The top is closed by an adapter threaded to match both the top of the launching tube and the threading in the head of the projectile. The adapter has a hole through the centre for the striker point and a half moon cartridge retaining lip on the top. There does not appear to a safety device used with this projectile.

The projectile is painted black and has a red band painted around the head. Other markings are painted in white. The date of manufacture is stamped into the lower end of the igniter housing.

CGN

TYPE- Practice
WEIGHT- 630 gm
DIAMETER- max 54 mm
LENGTH- 265 mm
FILLING- Practice Charge
IGNITER- Impact

When the projectile is fired, the creep spring keeps the firing pin from striking the primer of the practice charge. Upon impact the striker overcomes the resistance of the spring and hits the primer. The primer ignites the practice charge. The gases and smoke produced by the exploding practice charge escape through the holes in the head to mark the fall of shot.



CGN

Granat Reczny Przeciwpancerny wz. 57 (RPG 57)

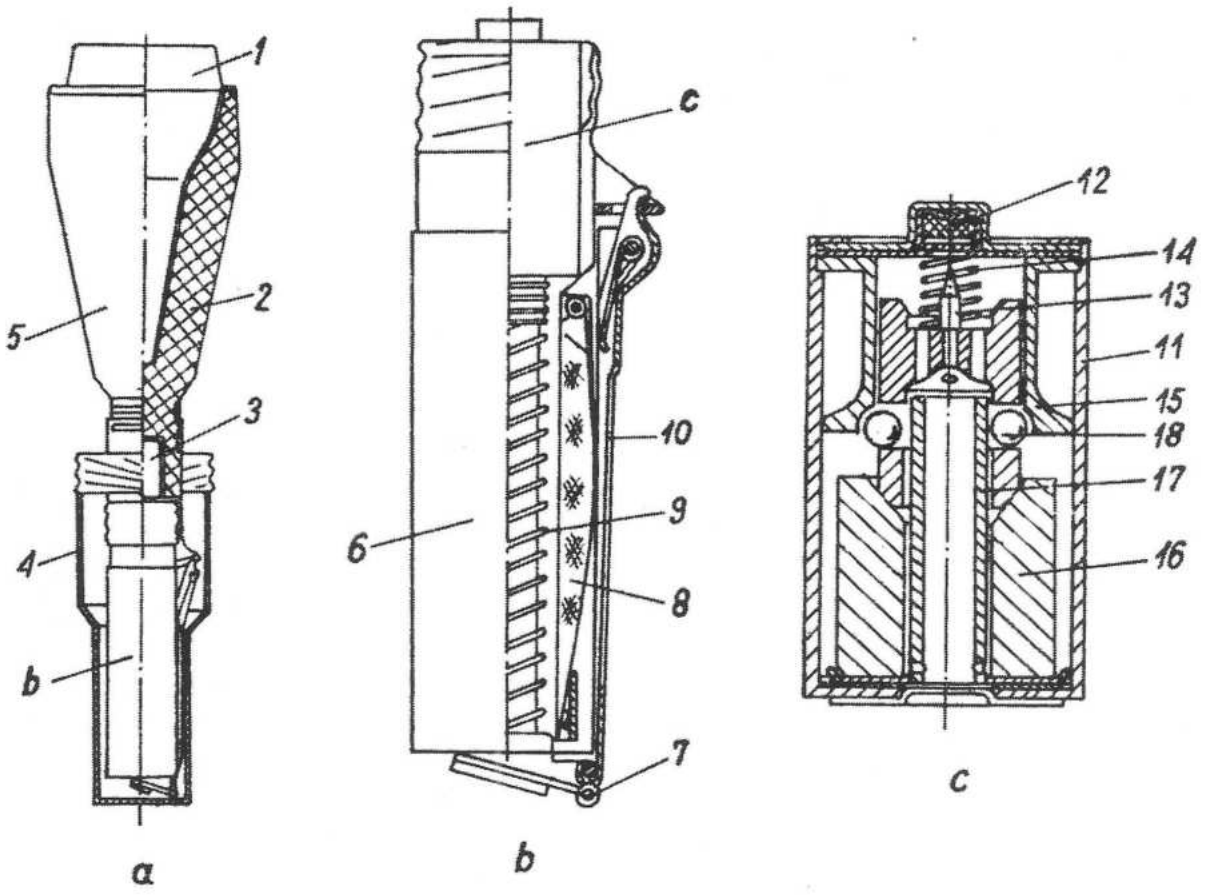
This is a Polish designed anti tank grenade identified in a manual dated 1961. It appears that this grenade was quickly replaced by Russian designs.

The warhead is made of sheet metal and contains a shaped charge. The warhead has a large roll threaded cap attached at the base and a roll threaded socket in the base. The handle assembly contains an impact igniter at the top end and a spring-loaded cloth stabilizer drogue in the bottom end. A safety handle runs along the side of the assembly and a safety pin is located on the bottom. The handle assembly screws into the socket in the base of the warhead. A sheet metal transit cover screws onto the roll threaded cap and encloses the entire handle assembly.

RPG 57

TYPE- Anti Tank
WEIGHT- 1078 gm
FILLING- 540 gm
IGNITER- OD-1 Impact
PENETRATION- 140 mm

The grenade is issued ready for use. For use, unscrew the transit cover and discard it. Hold the head in one hand and the handle in the other and turn. A safety pin at the bottom of the handle is then removed. When the grenade is thrown, the safety handle rotates out and releases the drogue. The spring in the handle forces the drogue out the rear of the handle causing the grenade to travel headfirst. As the



RPG 57		
Overall view	Handle Assembly	Fuze Assembly

drogue deploys it releases a final safety in the igniter mechanism. Upon impact with the target the igniter functions causing the shaped charge to explode.

Granat Nasadkowy Przeciwpancerny 60 (PGN 60)

This anti tank rifle grenade was most likely adopted in about 1960. It was used against armour, light fortifications and protected personnel.

The head is constructed two cones, the upper cone is an aluminum cone that forms an ogive while the grenade is in flight and more importantly provides the required stand off upon impact with the target. The bottom cone is also aluminum, is larger, and is seamed onto the upper cone with a very prominent seam around the middle. The filling is contained in the bottom portion and has a copper shaped charge liner on top. The base of the cone contains a booster and the detonator. A threaded portion at the bottom screws into the aluminum launching tube assembly. The launching tube assembly has an interior diameter of 20 mm to fit the Polish grenade launcher. The impact igniter is screwed into the top of the tube. The bottom of the tube has four steel fins that are constructed in four parts, three joins are riveted together, and the fourth allows the fins to fit

PGN-60

TYPE- Anti tank
WEIGHT- 580 gm
DIAMETER- 68 mm
LENGTH- 405 mm
FILLING- 218 gm RDX/TNT
IGNITER- Impact base detonating
PENETRATION- 140-180 mm

around the tube and is closed by nuts and bolts.

The grenade is painted olive green with markings in black. Markings give the designation, year of manufacture, and lot number. The grenade may have a large yellow instruction label attached to the ogive.

Granat Nasadkowy Przeciwpancerny 60 Cwiczebny (PGN-60 Cw)

PGN-60Cw

TYPE- Practice
WEIGHT- 580 gm
DIAMETER- 68 mm
LENGTH- 405 mm
FILLING- Inert
IGNITER- Inert

This version is a practice model used for firing practice. It is constructed exactly the same as a live grenade but has inert components. They may be used for as long as they remain intact. The fins are replaceable.

For identification the body is painted black and has markings in white. Markings give the designation, date of manufacture and lot number. Markings are found both on the head and on the launching tube assembly.

Granat Nasadkowy Przeciwpancerny 60 Szkolny (PGN-60 Sk)

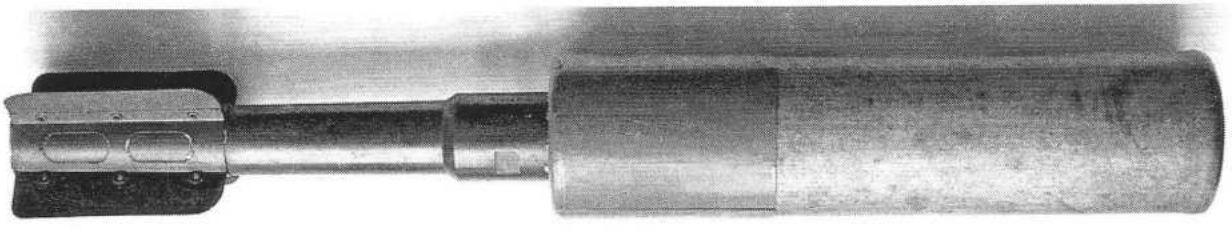
This is an inert instructional model used for classroom training. It is constructed exactly the same as a live grenade but uses inert components.

PGN-60Sk

TYPE- Training
WEIGHT- 580 gm
DIAMETER- 68 mm
LENGTH- 405 mm
FILLING- Inert
IGNITER- Inert

The grenade is painted green with a white band around the lower portion of the warhead. Other markings are in black.

PGN 60Cw PGN 60 Head
Photos- Ordata Online



DGN
Photo- Grzegorz Franczyk

Dymny Granat Nasadkowy (DGN)

This is a rifle grenade used to create a smoke screen at distances that would not be possible using hand thrown grenades.

It is simply a tail assembly with a standard RDG-2 smoke grenade attached. The tail assembly has a stabilizer/ launching tube with an internal diameter of 20mm. There are four fins 70 mm long riveted onto the bottom end. The upper end of the tube has a sheet metal cup attached to hold the smoke grenade. There are holes in the bottom of the cup to allow smoke from the burning grenade to escape. An adapter with the cup attached screws into the top of the stabilizer tube. There is a hole through the centre of the adapter to allow the flash of the launching cartridge to pass through and ignite the delay element of the RDG 2.

DGN
TYPE- Rifle, Smoke WEIGHT- 600 gm DIAMETER- 54 mm at base of body LENGTH- 390 mm FILLING- RDG-2 smoke grenade

Once ignited the RDG-2 emits smoke from both ends forming a very effective smoke screen.

Reczny Granat Obronny wz. 88 (RGO-88)

RGO-88
TYPE- Fragmentation WEIGHT- 500 gm DIAMETER- 57 mm LENGTH- 114 mm FILLING- 60 gm RDX IGNITER- UZRGM or UZGR FUZE DELAY- 2.8 - 4.2 sec.

This grenade was designed in the mid 1980's to replace the F1 in Polish service. It provides about three times the number of fragments than the F1 with the same effective radius.

The body is egg shaped and constructed of light sheet metal. Contained within the outer body is a liner of plastic matrix with approximately 1150 steel fragmentation balls embedded in it. Each ball weighs about 0.25 grams. The explosive bursting charge is contained within the inner liner. The top of the body has an igniter well formed in the centre that is threaded to accept the igniter mechanism. The igniter may either be the UZRGM or newer UZGR.

The body recognized by a wide flat seam in the middle. The grenade is painted mid brown or possibly dark green.

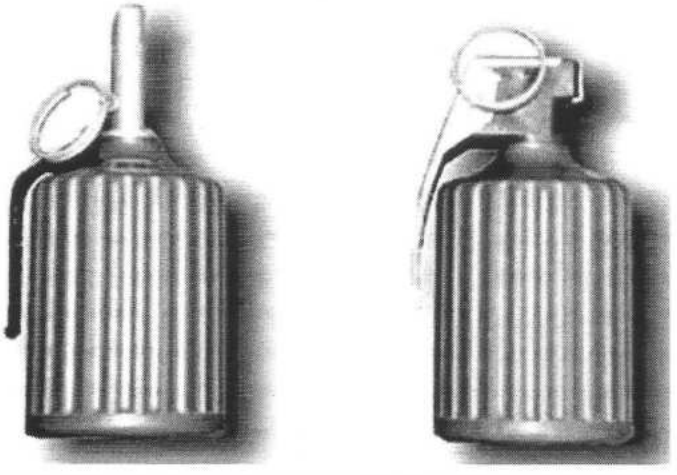
The main manufacturer is Zaklady Metalowe "Dezamet" SA at Nowa Deba.

***Rêczny* Granat Zaczepny wz. 89 (RGZ-89)**

This is the latest Polish grenade. In 1987 a project was begun to replace the RG 42 with a new more effective grenade. The results of the project became the RGZ-89 grenade in 1992. It was officially adopted by Polish forces in 1998.

RGZ-89
TYPE- Fragmentation WEIGHT- 380 gm DIAMETER- 58 mm LENGTH- 129 mm UZRGM 115 mm UZGR FILLING- 110 gm. A-IX-I IGNITER- UZRGM or UZGR FUZE DELAY- 2.8 - 4.2 sec.

The grenade has a cylindrical plastic body, ribbed to aid in gripping the grenade. The



RGZ-89 with UZGRM RGZ-89 with UZGR
Photo- P. Kupidura

body contains a serrated wire coil that will produce up to 700 fragments with an average weight of .13 grams. The igniter mechanism screws into a well formed in the top of the body. The grenade may be fitted with the UZRGM fuze mechanism or with the newer UZGR mechanism. The grenade can be thrown an average of 25-30 metres and has a danger radius of 5 metres.

The production of this grenade is at Zakledy Metalowe "Dezamet" SA at Nowa Deba.

Granat Nasadkowy Przeciwpancerno- Odlamnkowy (GNPO)

This is a current Polish anti armour rifle grenade that can be fired from 5.45mm, 5.56mm, or 7.62mm rifles with a muzzle diameter of 22mm. Normal ball cartridges are used to launch the grenade. A launching sight is incorporated with the stabilizing fins on each grenade. The grenade is capable of penetrating up to 80mm of armour. The grenade is painted olive green with a black band around the head and markings in black.

GNPO

TYPE- Armour Piercing
WEIGHT- 410 gm
DIAMETER- 40 mm
LENGTH- 278 mm
FILLING- 83 gm
IGNITER- ZGN base detonating
RANGE- 240 metres

Nasadkowy Granat Oswietlajacy (NGOs-93)

This is a current Polish illumination rifle grenade that can be fired from 5.45mm, 5.56mm, or 7.62mm rifles with a muzzle diameter of 22mm. Normal ball cartridges are used to launch the grenade. A launching sight is incorporated with the stabilizing fins on each grenade. The grenade produces illumination for a period of 20 seconds at a height of 100 metres. The grenade is painted olive green with a black band around the head and markings in black.

NGOs-93

TYPE- Illumination
WEIGHT- 550 gm
DIAMETER- 43 mm
LENGTH- 313.8 mm
RANGE- 150 metres

Nasadkowy Granat Dymny (NGD-93)

This is a current Polish smoke rifle grenade that can be fired from 5.45mm, 5.56mm, or 7.62mm rifles with a muzzle diameter of 22mm. Normal ball cartridges are used to launch the grenade. A launching sight is incorporated with the stabilizing fins on each grenade. The grenade will produce smoke for a period of approximately 50 seconds creating a smoke screen measuring 20 metres by 3 metres.The grenade is painted olive green with a black band around the head and markings in black.

NGD-93

TYPE- Smoke
WEIGHT- 445 mm
DIAMETER- 52 mm
LENGTH- 222 mm
RANGE- 200 metres

Nasadkowy Granat Zapalajacy (NGZ-93)

This is a current Polish incendiary rifle grenade that can be fired from 5.45mm, 5.56mm, or 7.62mm rifles with a muzzle diameter of 22mm. Normal ball cartridges are used to launch the grenade. A launching sight is incorporated with the stabilizing fins on each grenade. The grenade will burn for a period of about 30 seconds. The grenade is painted olive green with a red band around the head and markings in black.

NGZ-93

TYPE- Incendiary
WEIGHT- 450 mm
DIAMETER- 52 mm
LENGTH- 225 mm
RANGE- 200 metres

Production of all these rifle grenades is at Zaklady Metalowe "Dezamet".

Romanian Grenades

Unfortunately I have no information on Romanian Grenades prior to 1937 when Romania began to rearm its army. At that point, the Romanian adopted grenades from other nations. Notably the Polish Wz. O-33 and Wz. Z-33 grenades were adopted and known in Romania as MAN grenades. The Czech OUG vz 34 and ORG vz 38 were also adopted and known as Kyser G-34 and Kyser G-38. During WWII, Romania initially remained neutral but internal politics aligned it with the Axis under the dictator Antonescu. In 1939 Russia occupied Romanian territory without German opposition. In addition they were forced to cede territory to both Bulgaria and Hungary. In September of 1940 Germany occupied the remainder of Romania on the pretext of protecting the oilfields from British attack. From 1940 on, the Germans assisted in modernizing the Romanian Army. In 1941 Romania joined the war attacking Russia as part of the German invasion regaining the territory occupied by Russia in 1939. Romanian forces penetrated as far as Odessa. It can reasonably be assumed that the Germans would have supplied Romanian troops with grenades from German production at that time. During the fighting in Russia, Romanian forces suffered large numbers of casualties. On 20 August 1944, the Russian offensive against the German 6th Army caused the situation to deteriorate so rapidly that the Romanians had no choice but to end their alliance with Germany and place themselves at the mercy of the Russians. King Michael overthrew Antonescu and declared war on Germany on 25 August 1944. The Russians initially treated Romanian soldiers as prisoners, but Romanian forces were eventually used under Soviet command in the fighting in Hungary, Slovakia, Austria, and Moravia. At this point the supply of grenades was likely from Soviet sources.

After WWII, Romania aligned itself with the Soviets and proclaimed itself a people's republic in 1948. Romanian grenades at this point were likely supplied by the Soviets. Romania started producing its own grenades to the Soviet patterns, specifically the F1 and RG 42 grenades. Romania has since replaced the UZRGM fuze mechanisms with one of domestic design. These grenades were still being produced in the 1990's and may still be in production.

It appears that Romania has developed some newer grenades but information on these is currently very hard to find. There are two fuze mechanisms produced for use with grenades, the first is the FGM-1 that has a delay of 3-4.5 seconds, the second, which to all accounts appears identical in looks, is the FGP-1 with a delay of 9.5-12 seconds. It is possible that Romania has purchased some Bulgarian RGO 78 bodies and fitted them with the FGM-1 fuze mechanism.

Bulgarian RGO-78 with FGM-1 fuze mechanism

F1

This is a Romanian version of the F1 utilizing a Romanian designed igniter mechanism. It is produced by a State owned company, "Romtehnica".

The body appears to be a direct copy of the Russian model that has fitted with the FGM-1 percussion fuze mechanism. The fuze mechanism is of a conventional striker release type utilizing a safety lever. It appears that the fuze mechanism may be fitted with different delay elements depending on the grenade it is used in.

F1

TYPE- Fragmentation
WEIGHT- 566 gm
DIAMETER- 56 mm
LENGTH- 80 mm body
100 mm with fuze
IGNITER- FGM-1
FUZE DELAY- 4 -4.5 sec.
DANGER RADIUS- 100 metres

The grenade body is painted dark green and may have some markings in black. The igniter mechanism is unpainted with markings in black. What appears to be a lot number is painted on the underside of the safety lever and the designation painted on the outside.

F1

RG 42

This is a Romanian version of the RG42 utilizing a newer igniter mechanism of Romanian design.

RG-42

The grenade body is a direct copy of the Russian RG-42. The igniter mechanism is a Romanian designed FGM-1 percussion fuze utilizing a safety lever as a safety device. The fuze mechanism is used on a number of different grenades and may have different delay elements depending on the grenade.

Grenade body is painted dark green and may have some markings in black. The igniter mechanism is unpainted with markings in black. What appears to be a lot number is painted on the underside of the safety lever and the designation on the outside.

RG-42

TYPE- Fragmentation
WEIGHT- 450 gm
DIAMETER- 60 mm
LENGTH- 87 mm body
IGNITER- FGM-1
FUZE DELAY- 4 – 5.5 sec.
DANGER RADIUS- 35 metres

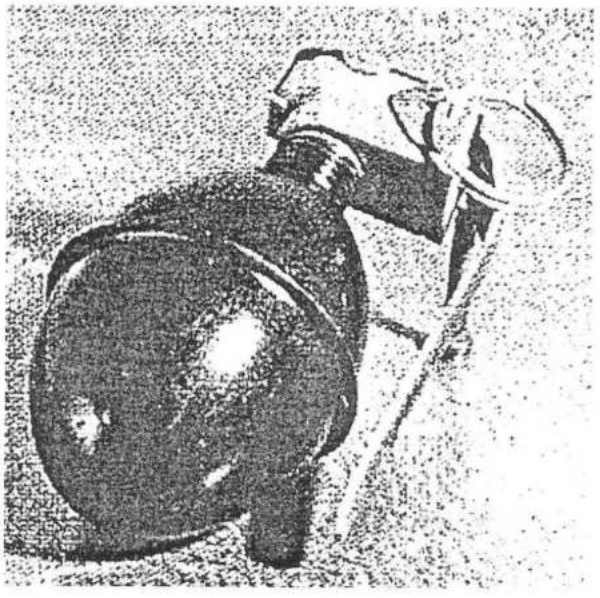
Model 92

Information is currently sketchy on this grenade. It is manufactured by "Uzina Mechanica Mija". From the designation we can assume it was adopted or developed around 1992. The only information available to me currently is a poor copy of a product information sheet put out by the company.

Model 92

TYPE- Offensive
WEIGHT- 255 gm
DIAMETER- 61 mm
LENGTH- Body 86mm
With Fuze 122mm
IGNITER- FGM-1
DELAY- 3 – 4.5 sec.

Its appearance is egg shaped, in fact very similar to the WWI vintage French OF-1. It is fitted with the FGM-1 type fuze mechanism.



Albania

Little is known about Albanian use of grenades prior to 1946. Albania joined the Warsaw Pact in 1950 and at that point was totally dependent on Russian for supplies of modern weapons including grenades. The Russians supplied F1 and RG42 grenades as the basic fragmentation grenades and likely the RPG43 as an antitank grenade. In the late 1950's China was attempting to gain influence in the area and approached Albania, who, in 1957 moved over to the Chinese camp who then supplied arms and ammunition. China sent representatives and assisted the Albanians in setting up a modern arms industry. In about 1960 machinery from China started to arrive and allowed the Albanians to start producing their own weapons. In 1960 they began to produce small arms, in 1965, explosives and propellants, and in 1966, grenades and ammunition.

An Albanian Military publication dated 1983 lists the following grenades, Model 42 (RG42), Model 59 (RDG-5), Model 1 (F1), Model 43 (RPG43), Model 6 (RPG-6), Model 3 (RKG-3), and Chinese Stick grenades. It is likely that these grenades remain in service with Albanian forces but there may have been some upgrading, unknown exactly what at this point.

Estonia

Throughout Estonia's history it has been controlled by a succession of countries, including Denmark, Sweden, Poland, and finally in 1710, Russia. With the fall of Imperial Russia, Estonia declared itself independent on February 18, 1918. Estonia maintained its independence for 22 years. Estonia was occupied by Soviet troops in 1940 and in 1941 during Operation Barbarossa by the Germans. Russia forced the Germans out in 1944 and reoccupied Estonia until 1991. With the collapse of the Soviet Union in 1991 Estonia regained independence with the last Soviet troops leaving in 1994. Estonia joined NATO and the European Union in 2004.

Latvia

Latvia as a country has had a very short history. The Russian revolution gave the Latvians the opportunity and on 19 November 1918, they declared Latvia an independent republic. Bolshevik troops later occupied Riga and supplanted the Latvian Government. Allied troops expelled Soviet troops from Latvia in 1920 and restored the Government. On the outbreak of WWII, Latvia adopted a neutral stance. In 1939 they signed a mutual assistance treaty with the USSR and later a reparations convention with Germany. Following the fall of France, in June of 1940 the USSR accused Latvia and Estonia of forming a secret anti-Soviet military alliance and occupied both countries. In August 1940 Latvia became a republic of the USSR. The Germans occupied Latvia during Operation Barbarossa in 1941. Latvian soldiers fought on both sides during the war. The occupying Germans drafted men into the Latvian Legion of the Waffen SS other men joining the opposing Russian forces. Russia reoccupied Latvia in 1944-45. During the period 1945 to 1990 Latvia remained a part of the USSR. In 1990 a declaration of independence was adopted subject to a transition period. Soviet troops completed withdrawal from Latvia in 1994. Latvia joined NATO and the European Union in 2004.

Having such a short history as a country also means a short history of grenades. The only confirmed reference I have of Latvian grenades is a manual dated 1926. The manual indicates the main grenade used by Latvian forces was the British Mills bomb, No. 36M Mk. I. It also indicates that some numbers of M1917 stick grenades and Eihandgranate M1917Na were on hand. The M1917 stick grenade was likely the Estonian version. The Egg grenade, while appearing the same as the German model, has a different igniter mechanism. The igniter has a matchead type igniter with the head covered by a metal cap. When the Russians occupied the country, they likely used any grenades in the inventory in training and possibly in the early fighting against the Germans. Thereafter Russian grenades were used exclusively.

Lithuania

Lithuania was part of the Russian Empire from the late 1700's until February 16, 1918 when it regained independence. Annexed and occupied by Russia in 1940 it was occupied by Germany in 1941 during Operation Barbarossa. Reoccupied by Russia in 1945 when the Germans retreated it remained a part of the Soviet Union until 1990. In 1990 Lithuania proclaimed its independence becoming the first Soviet republic to do so. Soviet troops attempted to prevent independence unsuccessfully until 1991. The last Soviet troops left Lithuania on August 31, 1993. In 2004 Lithuania became a full member of NATO and joined the European Union.

Little is known regarding the use of grenades by Lithuanian forces, however a manual post WWI indicates that they had a mixture of German and British grenades in use. These included the German Kugelhandgranate and Stielhandgranates and British No. 15 and No. 16 grenades. After becoming part of the Soviet Union Lithuanians would have been integrated into normal Soviet units using Soviet grenades.

Egg Grenade

This is an Estonian grenade that was taken into Russian service when Estonia was occupied by the Soviet Union. Use was from about 1920 to 1941. Stocks of the grenades captured by the Germans in 1941were designated as "Eihandgranate 308(r)".

Egg Grenade

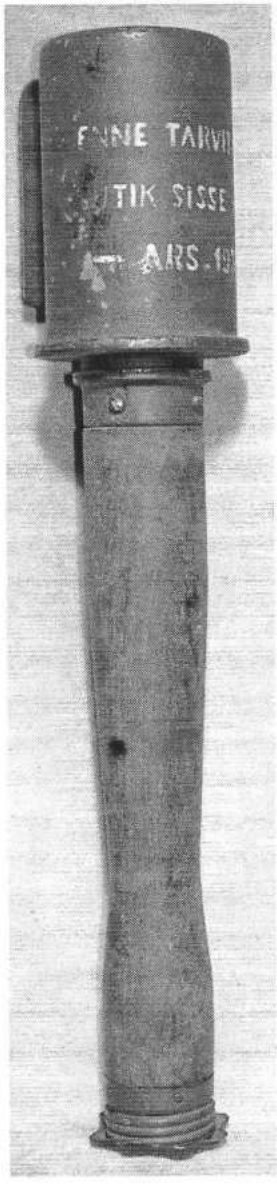
TYPE- Fragmentation
DIAMETER- 58 mm
LENGTH- 138 mm
FILLING- TNT
IGNITER- Percussion
FUZE DELAY- 3.4 – 4 sec.

The body appears to be cast iron with a threaded hole in top to accept the igniter mechanism. The igniter is a percussion type with a time delay element.

Estonian Egg Grenade

M1917

This grenade is virtually identical to the German Stielhandgranate M1917. It was adopted by Estonia in about 1920 and when the Russians occupied Estonia it remained in service until stocks ran out in about 1941.



The head is made of sheet metal with a bottom cap crimped on. The bottom cap has an internally threaded adapter formed in the centre for the handle to screw into. An internal closing cap is formed with a detonator well protruding into the centre of the filling. A carrying hook is riveted to the side of the head. The top of the handle has a threaded adapter attached by four screws. The adapter has threads matching the threading in the head. The bottom of the handle has a roll-threaded end attached by four small tacks. An end cap screws onto it. The end cap has a fluted piece riveted on to provide a good gripping surface. A friction igniter is contained within the upper portion of the handle with the pull string running through the handle to the bottom. A porcelain ball is attached to the pull string for easy gripping.

For use the grenade must be primed by unscrewing the head, fitting a detonator to the end of the igniter and screwing the head back on. When ready to throw, unscrew the end cap allowing the porcelain ball to drop out, grasp the ball and pull. At this point the friction igniter lights the delay fuze. Throw the grenade immediately. The delay fuze burns for 5 - 5.5 seconds until it reaches the detonator. When the detonator fires it causes the explosion of the main filling. The main effects of the grenade are from the blast formed by the explosion; little fragmentation is formed due to the sheet metal the grenade is constructed from.

M1917

TYPE- Offensive
DIAMETER- Maximum- 69mm
Main body- 61mm
LENGTH- Total- 350mm
Head- 98 mm
IGNITER- Friction
FUZE DELAY- 5 – 5.5 sec.
FILLING- 200 gm TNT or Pertit
DETONATOR- Nr. 8

The handle is unpainted, the head and cap on the handle are painted brown with markings in white. The head is marked with instructions "ENNE TARVITAMIST TIK SISSE PANNA" which means "Insert detonator before using". Below that appears to be the manufacturers initials and a date.

Explosives and Fillings

Grenades have been filled with many different explosives and compounds through the years. This listing is an extension of the listing in my previous books, as such, not all fillings listed have been used in Warsaw Pact grenades but new listings have been added.

AMATOL- Used as a bursting charge during WWI and WWII. A composition of Ammonium Nitrate and TNT it is normally yellow to brown in colour.

AMMONAL- There are several "recipes" for ammonal but all formulas contain aluminum, normally in powdered form. It is a fine grey hygroscopic powder with a composition of Ammonium Nitrate, TNT, Aluminium Powder and Charcoal. Ammonal does not freeze and is not effected by normal shock. It will not detonate if hit by a bullet nor will it detonate if wet.

ALUMATOL- A hygroscopic silver grey powder having a composition of Ammonium Nitrate, TNT, and Aluminum powder.

A-IX-1- A mixture of 94% RDX and 6%wax.

A-13 - A burning smoke mixture. Consists of 42% Potassium Chlorate, 15% raw Anthrazene, and 43% Ammoniim Chloride.

BALLISTITE- Invented in 1888 by Alfred Nobel. Compositions vary, 1- Nitro-Cotton of low nitration gelatinized with Nitro Glycerine. 2- Blasting Gelatine with proportion of Nitro Cellulose largely increased. 3- Gun-cotton, plus camphor, plus Vaseline.

BARATOL- Used as a bursting charge. It is a composition of Barium Nitrate and TNT. Baratol is normally yellow to brown in colour.

BELLITE- This explosive is of Swedish origin. It consists of 20% dinitrobenzene and 80% nitrate of ammonium.

BERGER MIXTURE- This is a mixture of 2 parts zinc dust and 5 parts hexachlorethane. Often pressed in and ignited by a small charge of black powder. This mixture smells like mothballs.

CHEDDITE- Cheddite was patented in 1897 by F.A.D. Street. It consists of potassium chlorate mixed with castor oil in which aromatic nitro-compounds are dissolved. It is not highly sensitive to shock or friction. It easily becomes hard and then does not completely detonate.

CHLORACETOPHENONE- This is a lachrymatory (tear) gas that produces severe burning sensations in the eyes. This may be combined with DM. Normally known as "CN".

CHLOROPICRIN- This is a slightly oily, colourless or slightly yellowish liquid. It vapours are highly poisonous if inhaled. Called PS by the British, Aquinite by the French, or Klop (Green Cross) by the Germans. It causes lachrymation, vomiting, bronchitis, and pulmonary edema. Can be fatal.

CILFERITE- A hygroscopic powder that is not effected by high temperatures. It is composed of Ammonium Nitrate, Ferro-silicon, Aluminum powder, and Wood Meal.

CN- Chloracetophenone. This is a lachrymatory (tear) gas that produces severe burning sensations in the eyes. This may be combined with CN

COMPOSITION A- This explosive consists of a mixture of 91% RDX and 9% wax.

COMPOSITION B- This explosive filling consists of 60% RDX, 39% TNT, and 1% wax. Used as a bursting charge in many post war grenades, this explosive is yellow to brown in colour.

CORDITE- Invented by Sir F. Abel and was adopted by Austria-Hungary in 1893. A high explosive of comparatively slow rate. Designed mainly for propulsion. Burns freely on ignition but will not explode without detonation. It is a mixture of highly nitrated gun-cotton, nitro glycerine, and vaseline gelatinized by means of acetone.

CS- CS has a powerful lachrymatory effect. It is irritating to the upper respiratory tract, causes coughing, difficulty in breathing, and tightness in the chest. In heavy concentrations it will cause nausea and vomiting. Incapacitation will begin in 15-20 seconds and its duration is less than 10 minutes after removal to fresh air.

DICHLORETHYL SULFIDE- Commonly known as Mustard gas. This is a highly persistant casualty producing gas. The gas will penetrate clothing and boots producing incapacitating burns on any part of the body the vapours come into contact with. In addition the gas is highly toxic causing serious casualties when breathed in minute concentrations. In its pure state it is a transparent amber, oily liquid. The gas is almost odourless in field concentrations but in high concentrations has a smell similar to horse radish or mustard.

DIPHENYL AMINECHORASINE- This gas causes a burning sensation in the nose and throat and a tight feeling in the chest. There is also a nauseating effect that depends on the concentration and length of exposure. Normally known as "DM".

DYNAMITE- Common commercial high explosive. Consists of nitro glycerine absorbed in sawdust, Fullers earth, cellulose etc. Dangerous at extreme temperatures or when wet. Very susceptible to shock.

FM- Fuming Mixture, see Titanium tetrachloride.

FULMINATE OF MERCURY- Its appearance is like fine sand. It is a very unstable explosive normally used in detonators. It is highly susceptible to heat or shock. White in colour when pure, normally grayish with a yellow tint.

GUNCOTTON- This was invented in 1846 by Shombeir, a Professor of Chemistry at Basle. Nitro-cellulose, consists of cotton waste that is purified, dried and heated with a mixture of concentrated nitric and sulphuric acid. It is washed and reduced to a pulp and moulded into slabs or primers. Dry, it will explode if hit with a bullet, wet, it will not. It is 2.5 times as powerful than gunpowder unconfined, 7-8 times if confined.

GUNPOWDER- One of the oldest known explosives. This is a mixture of potassium nitrate, sulphur, and carbon. These items are mixed together by grinding and other operations. Some gunpowders are black, brown, or slate coloured, mainly due to the different types of carbon (wood charcoal) used. Gunpowder is graded by size of granules and designated accordingly. The percentages of ingredients varies but is normally 75% nitrate, 15% carbon, and 10% sulphur.

HC SMOKE COMPOUND- Hexachlorethane-zinc mixture (Canadian formula) 43% Hexachlorethane, 4.5% Potassium Nitrate, 15% Calcium Silicide and 37.5 % Zinc Oxide. This mixture produces a dense cloud of white smoke when ignited. The smoke is harmless in normal concentrations. If this filling comes into contact with moisture, a chemical reaction can occur which causes the filling to spontaneously ignite.

HEXOGEN- Another name for RDX

HILLITE- A powder that causes sneezing and watering of the eyes. The powder is composed of light magnesium carbonate mixed with concentrated essence of red pepper.

HYDROCYANIC ACID- This is a clear colourless liquid that vapourizes into a gas upon release. it is a powerful nerve agent, non-persistant, and has a bitter almond or crushed peach odour. In weak concentrations it will cause dizziness, headache, an unpleasent taste in the mouth and a rush of blood to the head. In strong concentrations death is instantaneous. Known as "AC" by the USA.

LYDDITE- It consists of picric acid melted in vaseline and solidified. It is very poisonous and great care must be taken when handling it. It is hygroscopic and loses its power when wet.

NITRO-GLYCERINE- Discovered in 1847. It is a heavy, oily liquid that is colourless when pure. The commercial product is normally yellow. It is not hygroscopic and is almost insoluble in water. Does not dissolve oils, mineral jelly or sulphur. In liquid form it is too dangerous for use. It will explode at 360 degrees F. When absorbed in Fullers earth or other fillers it is called Dynamite.

PETN- Pentaerythrite Tetranitrate- This is a powerful explosive that is highly sensitive. PETN is used in boosters, detonating cord, and some blasting caps. It is nearly insoluble in water. White or Light buff in colour.

PICRIC ACID- A yellow crystalline in form. It is a by-product of gas manufacture; the heavy oil of coal tar is boiled and chemically treated resulting in carbolic acid. Nitric acid is carefully added to the carbolic acid, resulting in Picric acid. It is a safe and very powerful explosive. It does however form "picrates" with metals or acid salts, which are more sensitive to disturbing influences than the picric acid itself. When used in shells or grenades, the insides of the metal is varnished to prevent the formation of picrates.

PN 468A- A green smoke composition consisting of Sucrose, Potassium Chlorate Grade II, yellow and green dye.

PN469A- A red smoke composition consisting of Sucrose, Potassium Chlorate Grade II, yellow and violet dye.

PN 471A- A blue smoke composition composed of Sucrose, Potassium Chlorate Grade II, and blue dye.

PN490A- A green smoke composition consisting of Sucrose, Potassium Chlorate Grade II, yellow and green dye.

PN 757- Red smoke composition consisting of Lactose, Potassium Chlorate grade II, red dye, and Kaolin Colloidal

PN758- Blue smoke composition consisting of Lactose, Potassium Chlorate grade II, blue dye, and Zinc Oxide

PN759- Green smoke composition consisting of Lactose, Potassium Chlorate grade II, green dye, yellow dye, and Zinc Oxide

PN760- Orange yellow smoke composition consisting of Lactose, Potassium Chlorate grade II, yellow dye, orange dye, and Zinc Oxide.

PYROXILIN- Nitrocellulose with a low proportion of Nitrogen (12-12.6%)

QUICK MATCH- This is made by boiling three strands of cotton wick in a liquid containing mealed powder and gum. It is then dusted with mealed powder before it gets dry. They are then enclosed with flax to carry the flame along rapidly.

RDX- (Research Department Explosive) Developed in the Research Department of Woolwich Arsenal. One of the most powerful military explosives. It is highly sensitive with great shattering effects. Normally used in composite explosives and blasting caps. White in colour. Also known as Hexogen.

SCHNIDERITE- 88% Ammonium Nitrate 12% Dinitronaphalene

SLOW MATCH- This is made by steeping a rope in a solution of saltpetre (potassium nitrate) and limewater then allowing the rope to dry. It will then burn at approximately one foot per hour.

SR252- (Canadian formula) A priming compound made up of Potassium Nitrate, Silicon, and Gunpowder, sulphurless mealed.

TETRYL- A powerful high explosive used in boosters, as a component in mixed explosive, and as a base charge in detonators. Light yellow in colour. It is a coal tar product containing more nitrogen than TNT or Picric Acid but is also more sensitive.

THERMITE- Once ignited, thermite will attain burning temperatures of up to 5000 degrees. Thermite is a mixture of aluminum oxide and iron oxide. Military thermite normally has Barium Nitrate added to reduce the ignition temperature and increase the thermal effects. Normally used to destroy equipment such as Artillery pieces, machine guns, or any other equipment that can be destroyed by welding.

TITANIUM TETRACHLORIDE is a smoke chemical agent used as far back as WWI. It is a liquid and used for screening smoke, not signaling smoke. It is a colourless to light yellow fuming liquid with a very pungent odor. It is corrosive and will damage the eyes, nose, and throat. Extreme exposure can cause lung failure and death, but that is rare. Also known as FM.

TNT- Used as a bursting charge, as an ingredient of composition explosives, or as a demolition charge. TNT is light yellow to buff in colour.

TONITE- This is formed by impregnating guncotton with one or more nitrates.

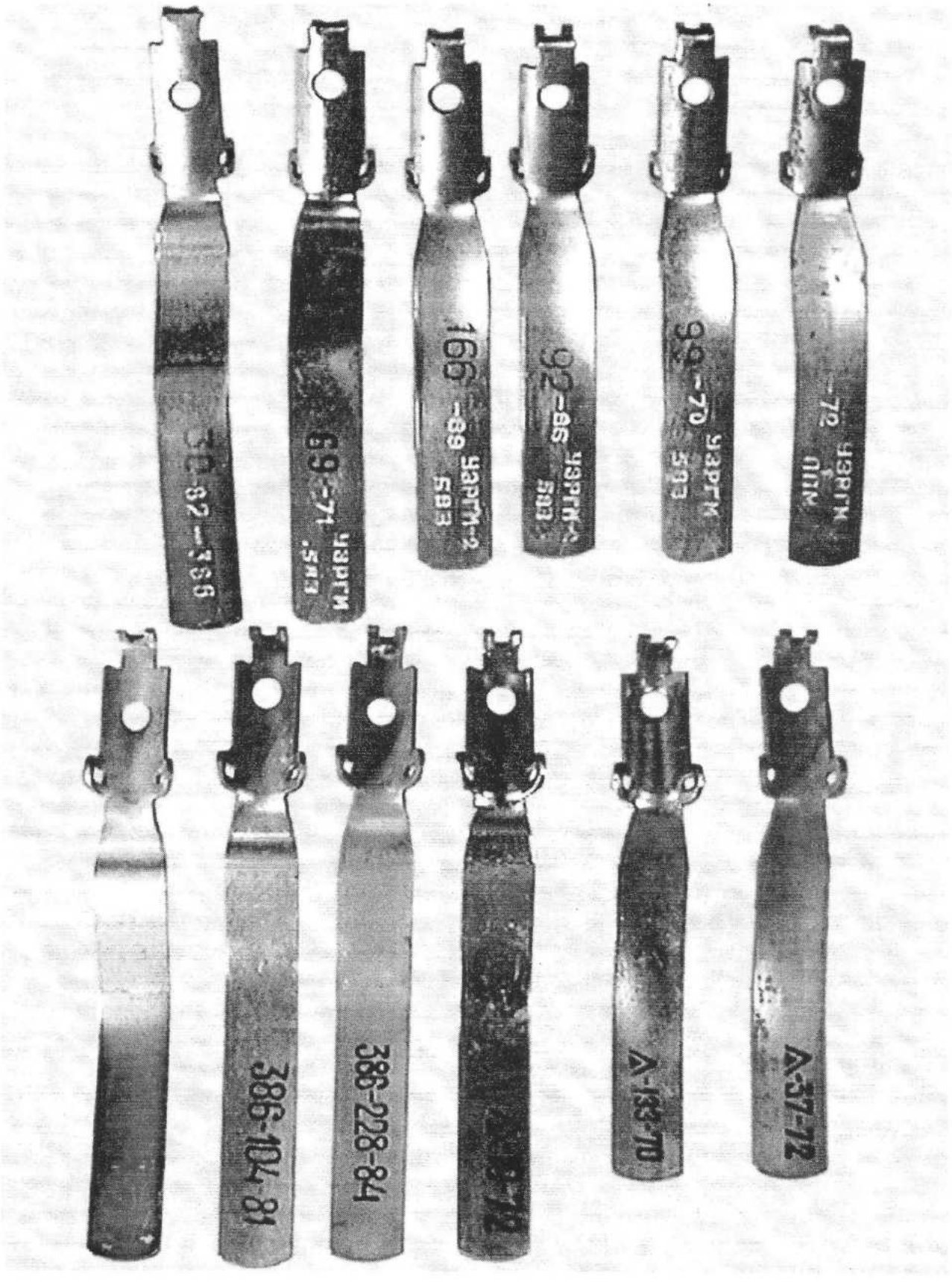
TROTYL- This is the German name for TNT. The British also used this term for TNT.

TWH526- (Canadian formula) This is a mixture of Potassium Nitrate Grade 2, Hexachlorethane, Zinc Oxide, and Calcium Sillicide.

WESTONITE- Produces a localized effect that is most effective in dry weather. The compound is formed of sulphur chloride and bromine saturated with chlorine. When grenades filled with this detonate, a combination of gases is produced including chlorine, bromine, hydrochloric acid, and sulphur chloride. Produces coughing and partial suffocation in effected troops.

WHITE PHOSPHOROUS- White phosphorous (WP) also known as Yellow Phosphorous is normally a solid at normal temperature. It is a transparent solid that normally has a white/yellow crust on it. When exposed to light it darkens on the surface. It boils at 280 degrees F and will ignite by itself at 30 degrees F. When cut off from air (underwater, oil, wet sand, etc.) it will not burn and can be handled. Once exposed to air it will ignite spewing out burning particles as it burns and is very difficult to extinguish, except by covering it with water.

Warsaw Pact Manufacturers Codes



Determining the factory coding of countries of the Warsaw Pact is difficult and confusing to say the least, most likely designed to be that way. I have listed what I have been able to find in various references, not that I can be completely sure they are all correct. The use of numbered factories throughout the Warsaw Pact and in fact countries aligned with them disguises the actual locations of the factories. Included in the countries using the numbered system are China, Cuba, North Korea, and Vietnam. It should be noted that where USSR is noted as the country, the factories may well be located in countries that were absorbed into the USSR like Lithuania or Latvia. I have included non Warsaw Pact numbered codes for clarity. And just to muddy the waters a bit, several codes are listed for several countries as evidence indicates the numbers were used by the listed countries. In addition, there may be several codes for the same factory.

Numbered Factories

Marking or Code	Country	Factory
0	Czechoslovakia	
00	USSR	
1	China	
2	USSR	Factory 2 in Kovrov
3	USSR (Albania)	Ulianovsk Machinery Plant
04	DDR	Volkseigene Betrieb (VEB) Mechanische Werkstätten
05	DDR	Spreewerke, Lübben
06	DDR	Sprengstoffwerk Kapen
07	USSR	Vympel
10	USSR	Ammuniton Factory 10, until 1946
10	Bulgaria	Arsenal Co. Kazanlak
11	China	Norinco, Mudanjang
11	Yugoslavia(Serbia)	Privi Partisan
12	Yugoslavia	
13	Cuba	
14	Yugoslavia	
17	USSR	Podolsk Ammunition Factory
20	Bulgaria	Arcus Co.
21	Hungary	Mátravidéki Fémmüvek Sirok
21	Poland	Zaklady Metalowe MESKO, Skarzysko-Kamienna
21	Romania	Uzinale Metalugica Di Copsa Mica Si Cugir
22	Bulgaria	Arsenal Co.
22	Romania	
23	Hungary	
23	Romania	
29	USSR	State Factory 29
30	USSR	
31	China	
32	China	
33	Bulgaria	Arcus Co. Lyaskovets
33	Czechoslovakia	WaffenwerkBrünn
34	China	
38	USSR	Yuryusan Ammunition Factory
38	USSR	Used by Tula until 1941
39	USSR	State Factory 39

Marking or Code	Country	Factory
41	China	
42	USSR	Kuybishev Factory
46	USSR	Ammunition Factory Moscow-Kutsevo
50	USSR	Penza Ammunition Factory
51	China	
54	Poland	Panstwowe Fabryka Am., Skarzysko-Kam
54	USSR	Ammunition Factory 54 Nitra
55	USSR	
58	USSR	Ammunition Factory 58, 1930's only
58	Bulgaria	
60	USSR	Bishkek Ammunition Factory
61	Bulgaria	Terem Kostenec
66	USSR	Factory 66 in Zlatoust
70	USSR	
71	China	
74	USSR	
80	USSR	
81	China	
89	USSR	
93	North Korea	
95	North Korea	
101	China	Heilongjiang North Tool Factory in Mundanjiang
106	USSR	Novosibirsk Ammunition Factory
109	North Korea	
111	China	
116	USSR	
121	China	
122	Yugoslavia	
129	USSR	Ammunition Factory 129, WWII only
131	China	
135	USSR	
141	China	
142	China	
147	USSR	Tula Arsenal
171	China	
174	USSR	Tula Ammunition Factory
176	USSR	Tula Ammunition Factory
179	USSR	Novosibirsk Ammunition Factory, up to 1949
179	China	
184	USSR	"Pozis" Production Association Factory
186	USSR	
187	USSR	Tula Ammunition Factory
188	USSR	Novosibirsk Low Voltage Equipment Plant
200	USSR	
201	China	
203	USSR	Sarapol Ammunition Factory
206	USSR	
211	China	

Marking or Code	Country	Factory
213	USSR	
218	North Korea	
221	China	
233	Bulgaria	Kostenets
234	Poland	
239	North Korea	
254	USSR	
257	USSR	Omsk Ammunition Factory
270	USSR(Ukraine)	Lugansk Mechanical Plant, Now "Tasco"
283	USSR	
301	China	
304	USSR	Moscow-Kutsevo Ammunition Factory, until 1946
312	Romania	
312	China	
315	Romania	
317	Romania	
321	China	
321	Romania	U.M. Sadu Plant
322	Romania	U.M. Sadu Plant
323	Romania	U.M. Sadu Plant
324	Romania	
325	Romania	
331	China	
334	USSR	
335	USSR	
341	China	
343	USSR	
343	Poland	State Munitions Factory at Krupski Mlyn (Silesia)
348	USSR	
349	USSR	
350	USSR	
351	China	
352	China	
354	Poland	
356	USSR	Sverdlovsk Ammunition Factory
366	USSR	Tula Cartridge Works
367	USSR	
368	China	
373	Poland	
386	USSR	
398	USSR	Factory 398, active in 1956
406	USSR	
424	Romania	
451	China	
456	Romania	
459	Romania	
501	China	
507	USSR	

Marking or Code	Country	Factory
509	USSR	
513	USSR	Omsk Ammunition Factory
514	USSR	Chtcherbakov Ammunition Factory
527	USSR	
529	USSR	Novaia Lialia Ammunition Factory, WWII only
530	USSR	Factory 530
539	USSR	Tula Ammunition Factory
540	USSR	Ammunition Factory 540, Irkutsk, WWII only
541	USSR	Ammunition Factory 541, Tcheliabinsk, WWII only
543	USSR	Ammunition Factory 543, Kazan, WWII only
544	USSR	Ammunition Factory 544, Glozov, WWII only
545	USSR	Ammunition Factory 545, Tchekalov, WWII only
547	USSR	Prior to 1945
556	USSR	Ammunition Factory 556, Novoibirsk
572	USSR	Factory 572
583	USSR	
601	Czechoslovakia	Sellier & Bellot, Prague
601	China	
603	USSR	Factory 603
606	USSR	Kemerovo Mechanical Plant
611	USSR	Prior to 1945
629	USSR	Ammunition Factory 629, WWII only
641	China	
650	China	
651	China	
661	China	
671	China	
707	USSR	
710	USSR	Podolsk Ammunition Factory, until 1948
711	USSR	Klimovsk Stamping Plant
768	USSR	Ammunition Factory 768, WWII only
911	China	
944	China	
946	China	
947	China	
948	China	
964	China	

Other Markings

aym	Czechoslovakia	
bxn	Czechoslovakia	
CMC	Romania	
CZO	Czechoslovakia	
dtp	Czechoslovakia	
EIGN	Yugoslavia	
FTM	Hungary	
HTI	Hungary	M.O.D. Institute for Military Technology

Marking or Code	Country	Factory
IK	Yugoslavia	Igman
irv	Czechoslovakia	Zeveta Bojkovice
K	USSR	
L	USSR	Lugansk Ammunition Plant
NIKE	Hungary	Nike Fiocchi
NF	Hungary	Nike Fiocchi
nny	Yugoslavia	Privi Partisan
nr	Yugoslavia	
P	USSR	Podolsk Ammunition Factory
PFA	Poland	
PP	Yugoslavia	Privi Partisan
PPU	Yugoslavia	Privi Partisan
ppy	Yugoslavia	
PP-YU	Yugoslavia	Privi Partisan
PS	Czechoslovakia	
RPR	Romania	
SZ	Czechoslovakia	Ammunition Works, Skoda
T	USSR	Tula Ammunition Works
uxa	Czechoslovakia	
V	USSR	Vostok Open Joint Stock Co., Klimovsk
Z	Czechoslovakia	
ZV	Czechoslovakia	

References

Various Bulgarian Manuals and documents
Various Czech Manuals and documents
Various East German Manuals and documents
Various Hungarian Manuals and documents
Various Polish Manuals and documents
Various Russian Manuals and documents
Various US recognition manuals and documents

Brassey's Infantry Weapons of the World, Bonanza Books, New York, 1978
The Official Soviet Army Hand Grenade Manual, Maj. James F Gebhardt, Paladin Press
Deutsche Gewehrgranaten, Michael Heidler, Verlag W. Sunkel, Offenhausen, 2003
Data sheets produced by Evgeny Kravchenko
International Ammunition Association Inc. Journals, Multiple issues

A partial list of online resources follows:

Arcus bg- http://www.arcus-bg.com/
Arsenal bg- http://www.arsenal-bg.com/defense.htm#handgrenades
Dezamet SA- http://www.dezamet.com.pl/dezamet/o_spolce_en.html
Finnish Junkyard- http://netti.nic.fi/~junkyard/grenades.html
Hungarian Website- http://gamma21.freeweb.hu/mfegyver.html
Inert ord- http://inert-ord.net
Infantry vs Tanks- http://infvstanks.newmail.ru/grvint/rus.html
Ordata Online- http://ordatamines.maic.jmu.edu/
TGRM- http://members.shaw.ca/dwlynn/tgrm.htm
WK2ammo- http://213.147.60/blaze/index.php
World War Two in Hungary- http://www.netlabor.hu/roncskutatas/modules/wfsection/article/php?articleid=219

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